

## SEARCH REQUEST FORM

Scientific and Technical Information Center

Requester's Full Name: Monique Willis Examiner #: 75068 Date: 5/17/04  
 Art Unit: 1746 Phone Number 301-272-1309 Serial Number: 09/865,478  
 Mail Box and Bldg/Room Location: 6C71 Results Format Preferred (circle) PAPER DISK E-MAIL

If more than one search is submitted, please prioritize searches in order of need.

\*\*\*\*\*

Please provide a detailed statement of the search topic, and describe as specifically as possible the subject matter to be searched. Include the elected species or structures, keywords, synonyms, acronyms, and registry numbers, and combine with the concept or utility of the invention. Define any terms that may have a special meaning. Give examples or relevant citations, authors, etc, if known. Please attach a copy of the cover sheet, pertinent claims, and abstract.

Title of Invention: Solid Composite Polymer Electrolyte  
 Inventors (please provide full names): Yui-Wen Chen, Yang, Hung-Chang Chen,  
Fu-Luo Lin  
 Earliest Priority Filing Date: 5/29/2001

\*For Sequence Searches Only\* Please include all pertinent information (parent, child, divisional, or issued patent numbers) along with the appropriate serial number.

*please do a search on claims 1 + 13.*

*Thanks.*

## STAFF USE ONLY

	Type of Search	Vendors and cost where applicable
Searcher: <u>Rozman</u>	NA Sequence (#) _____	STN <u>✓</u>
Searcher Phone #: <u>2-2546</u>	AA Sequence (#) _____	Dialog _____
Searcher Location: <u>E171700</u>	Structure (#) <u>✓</u>	Questel/Orbit _____
Date Searcher Picked Up: <u>5/29/04</u>	Bibliographic _____	Dr.Link _____
Date Completed: <u>5/29/04</u>	Litigation _____	Lexis/Nexis _____
Searcher Prep & Review Time: _____	Fulltext _____	Sequence Systems _____
Clerical Prep Time: <u>60 min</u>	Patent Family _____	WWW/Internet _____
Online Time: <u>2h</u>	Other _____	Other (specify) _____

L Number	Hits	Search Text	DB	Time stamp
1	3183	ELECTROLYTE AND POLYACRYLONITRILE	USPAT; US-PGPUB; EPO; JPO; DERWENT	2004/05/21 21:06
2	154296	(aluminum adj oxide) or (titanium adj dioxide)	USPAT; US-PGPUB; EPO; JPO; DERWENT	2004/05/21 21:12
3	451	((ELECTROLYTE AND POLYACRYLONITRILE) and ((aluminum adj oxide) or (titanium adj dioxide)))	USPAT; US-PGPUB; EPO; JPO; DERWENT	2004/05/21 21:06
4	35	((ELECTROLYTE AND POLYACRYLONITRILE) and ((aluminum adj oxide) or (titanium adj dioxide))) and (lithium adj perchlorate)	USPAT; US-PGPUB; EPO; JPO; DERWENT	2004/05/21 21:09
5	17	((ELECTROLYTE AND POLYACRYLONITRILE) and ((aluminum adj oxide) or (titanium adj dioxide))) and (lithium adj perchlorate) and amorphous	USPAT; US-PGPUB; EPO; JPO; DERWENT	2004/05/21 21:10
6	17	((ELECTROLYTE AND POLYACRYLONITRILE) and ((aluminum adj oxide) or (titanium adj dioxide))) and (lithium adj perchlorate) and amorphous and (composite or composition)	USPAT; US-PGPUB; EPO; JPO; DERWENT	2004/05/21 21:10
7	36038	((aluminum adj oxide) or (titanium adj dioxide)) and ceramic	USPAT; US-PGPUB; EPO; JPO; DERWENT	2004/05/21 21:12
8	163	(ELECTROLYTE AND POLYACRYLONITRILE) and ((aluminum adj oxide) or (titanium adj dioxide)) and ceramic	USPAT; US-PGPUB; EPO; JPO; DERWENT	2004/05/21 21:12
9	18	((ELECTROLYTE AND POLYACRYLONITRILE) and ((aluminum adj oxide) or (titanium adj dioxide)) and ceramic) and (lithium adj perchlorate)	USPAT; US-PGPUB; EPO; JPO; DERWENT	2004/05/21 21:13
10	738	(ELECTROLYTE AND POLYACRYLONITRILE) and filler	USPAT; US-PGPUB; EPO; JPO; DERWENT	2004/05/21 21:13
11	208	((ELECTROLYTE AND POLYACRYLONITRILE) and filler) and ((aluminum adj oxide) or (titanium adj dioxide))	USPAT; US-PGPUB; EPO; JPO; DERWENT	2004/05/21 21:13
12	7	((ELECTROLYTE AND POLYACRYLONITRILE) and filler) and ((aluminum adj oxide) or (titanium adj dioxide)) and (lithium near perchlorate)	USPAT; US-PGPUB; EPO; JPO; DERWENT	2004/05/21 21:14

**lithium polymer battery**

L23 ANSWER 34 OF 35 CAPLUS COPYRIGHT 2004 ACS on STN  
 TI Solid acrylic **polymer**-containing **electrolytes** for  
**lithium secondary batteries**

L23 ANSWER 35 OF 35 CAPLUS COPYRIGHT 2004 ACS on STN  
 TI Secondary **batteries** with solid **polymer**  
**electrolytes**

=> d ibib abs hitstr ind total

L23 ANSWER 1 OF 35 CAPLUS COPYRIGHT 2004 ACS on STN  
 ACCESSION NUMBER: 2004:182342 CAPLUS  
 DOCUMENT NUMBER: 140:202487  
 TITLE: Rechargeable **composite polymer**  
**battery** with high energy density  
 INVENTOR(S): Rodriguez, Rafael; Abraham, Kuzhikalail M.; Dicarlo,  
 Joseph  
 PATENT ASSIGNEE(S): USA  
 SOURCE: U.S. Pat. Appl. Publ., 11 pp.  
 CODEN: USXXCO  
 DOCUMENT TYPE: Patent  
 LANGUAGE: English  
 FAMILY ACC. NUM. COUNT: 1  
 PATENT INFORMATION:

*Data*

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
US 2004043295	A1	20040304	US 2003-645154	20030821
PRIORITY APPLN. INFO.:			US 2002-405162P P	20020821

AB Rechargeable **composite polymer batteries** are disclosed employing **composite polymer electrolytes** comprising an inorg. oxide, exemplified by fumed SiO<sub>2</sub>, and an organic **polymer**, exemplified by poly(vinylidene fluoride)-hexafluoropropene copolymer, gelled with Li-ion **battery electrolytes**. The **composite polymer electrolytes** are prepared by forming a suspension of the inorg. oxide in a solution of the organic **polymer** contained in a suitable carrier solvent, spraying the suspension onto the surfaces of Li-ion **battery** electrodes to form inorg. oxide-organic **polymer composite** films that adhere to the electrode surfaces, and gelling the films with Li-ion **battery electrolytes** in-situ to form **composite** inorg. oxide-organic **polymer gel electrolytes**. Li-ion **battery** cells are then constructed with the resulting electrode-**polymer electrolytes**.

IT 1344-28-1, Alumina, uses 7791-03-9, Lithium perchlorate 13463-67-7, Titania, uses 25014-41-9, Polyacrylonitrile

RL: DEV (Device component use); USES (Uses)  
 (rechargeable **composite polymer battery**)

- L23 ANSWER 21 OF 35 CAPLUS COPYRIGHT 2004 ACS on STN  
TI Gel **electrolytic** precursor and manufacturing of non-aqueous secondary **battery**
- L23 ANSWER 22 OF 35 CAPLUS COPYRIGHT 2004 ACS on STN  
TI Fabrication of a **lithium** secondary **battery** comprising a superfine fibrous **polymer electrolyte**
- L23 ANSWER 23 OF 35 CAPLUS COPYRIGHT 2004 ACS on STN  
TI Fabrication of a **lithium** secondary **battery** comprising a superfine fibrous **polymer** separator film
- L23 ANSWER 24 OF 35 CAPLUS COPYRIGHT 2004 ACS on STN  
TI Fabrication of **composite polymer electrolyte** and a **lithium** secondary **battery** comprising the **composite polymer electrolyte**
- L23 ANSWER 25 OF 35 CAPLUS COPYRIGHT 2004 ACS on STN  
TI Fabrication method of **lithium** secondary **battery** with hybrid **polymer electrolyte**
- L23 ANSWER 26 OF 35 CAPLUS COPYRIGHT 2004 ACS on STN  
TI Method of producing ion conductive laminate for **electrolyte** application in **electrochemical** cells
- L23 ANSWER 27 OF 35 CAPLUS COPYRIGHT 2004 ACS on STN  
TI **Polymer electrolyte** elements, manufacture of the elements and rolls of the elements, the **polymer electrolyte** element rolls, and manufacture of **batteries**
- L23 ANSWER 28 OF 35 CAPLUS COPYRIGHT 2004 ACS on STN  
TI **Polymer electrolyte** membrane for use in **lithium batteries**
- L23 ANSWER 29 OF 35 CAPLUS COPYRIGHT 2004 ACS on STN  
TI All-solid-state **electrochemical** device and method of manufacturing
- L23 ANSWER 30 OF 35 CAPLUS COPYRIGHT 2004 ACS on STN  
TI Improved **lithium ion polymer electrolytes** and methods of manufacturing an **electrochemical** cell
- L23 ANSWER 31 OF 35 CAPLUS COPYRIGHT 2004 ACS on STN  
TI Microporous solid **electrolytes** for **lithium** secondary **batteries**
- L23 ANSWER 32 OF 35 CAPLUS COPYRIGHT 2004 ACS on STN  
TI Solid **electrolytes** using absorbent for rechargeable **lithium batteries**
- L23 ANSWER 33 OF 35 CAPLUS COPYRIGHT 2004 ACS on STN  
TI The characteristics of **polymer electrolyte** for

=> file reg

FILE 'REGISTRY' ENTERED AT 13:49:59 ON 21 MAY 2004  
USE IS SUBJECT TO THE TERMS OF YOUR STN CUSTOMER AGREEMENT.  
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provided by InfoChem.

STRUCTURE FILE UPDATES: 20 MAY 2004 HIGHEST RN 684211-73-2  
DICTIONARY FILE UPDATES: 20 MAY 2004 HIGHEST RN 684211-73-2

TSCA INFORMATION NOW CURRENT THROUGH JANUARY 6, 2004

Please note that search-term pricing does apply when  
conducting SmartSELECT searches.

Crossover limits have been increased. See HELP CROSSOVER for details.

Experimental and calculated property data are now available. For more  
information enter HELP PROP at an arrow prompt in the file or refer  
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<http://www.cas.org/ONLINE/DBSS/registryss.html>

=> file caplus

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FILE COVERS 1907 - 21 May 2004 VOL 140 ISS 22  
FILE LAST UPDATED: 20 May 2004 (20040520/ED)

This file contains CAS Registry Numbers for easy and accurate  
substance identification.

=> d que 123

L5 STR

P=N  
1 2

NODE ATTRIBUTES:  
DEFAULT MLEVEL IS ATOM  
DEFAULT ECLEVEL IS LIMITED

GRAPH ATTRIBUTES:  
RING(S) ARE ISOLATED OR EMBEDDED  
NUMBER OF NODES IS 2

STEREO ATTRIBUTES: NONE  
L6 STR

C~C  
1 2

NODE ATTRIBUTES:  
DEFAULT MLEVEL IS ATOM  
DEFAULT ECLEVEL IS LIMITED

GRAPH ATTRIBUTES:  
RING(S) ARE ISOLATED OR EMBEDDED  
NUMBER OF NODES IS 2

STEREO ATTRIBUTES: NONE  
L9 STR

O~Ak C=N  
@3 4 @1 @2

G1 5

VAR G1=3/1/2  
NODE ATTRIBUTES:  
DEFAULT MLEVEL IS ATOM  
DEFAULT ECLEVEL IS LIMITED

GRAPH ATTRIBUTES:  
RING(S) ARE ISOLATED OR EMBEDDED  
NUMBER OF NODES IS 5

STEREO ATTRIBUTES: NONE  
L11 1 SEA FILE=REGISTRY ABB=ON PLU=ON 7791-03-9  
L12 1 SEA FILE=REGISTRY ABB=ON PLU=ON 1344-28-1  
L13 2 SEA FILE=REGISTRY ABB=ON PLU=ON "TITANIUM OXIDE"/CN  
L14 SCR 2043

secondary battery

- L23 ANSWER 9 OF 35 CAPLUS COPYRIGHT 2004 ACS on STN  
TI **Electrochemical** device using multicomponent **composite** membrane film
- L23 ANSWER 10 OF 35 CAPLUS COPYRIGHT 2004 ACS on STN  
TI Polyacrylonitrile **electrolytes** 1. A novel high-conductivity **composite polymer electrolyte** based on PAN, LiClO<sub>4</sub> and  $\alpha$ -Al<sub>2</sub>O<sub>3</sub>
- L23 ANSWER 11 OF 35 CAPLUS COPYRIGHT 2004 ACS on STN  
TI A multi-layered, UV-cured **polymer electrolyte** for **lithium secondary battery**
- L23 ANSWER 12 OF 35 CAPLUS COPYRIGHT 2004 ACS on STN  
TI Fabrication of **lithium secondary battery** with a UV-cured multi-component **polymer blend electrolyte**
- L23 ANSWER 13 OF 35 CAPLUS COPYRIGHT 2004 ACS on STN  
TI Secondary Li ion **battery** using colloidal **polymer** as **electrolyte** and its preparing process
- L23 ANSWER 14 OF 35 CAPLUS COPYRIGHT 2004 ACS on STN  
TI Multicomponent **composite** film and method for preparing the same
- L23 ANSWER 15 OF 35 CAPLUS COPYRIGHT 2004 ACS on STN  
TI Methods for preparation of microporous solid **electrolytes** for rechargeable **batteries**
- L23 ANSWER 16 OF 35 CAPLUS COPYRIGHT 2004 ACS on STN  
TI Fabrication method for **lithium secondary battery** with **polymer electrolyte** prepared by spray method
- L23 ANSWER 17 OF 35 CAPLUS COPYRIGHT 2004 ACS on STN  
TI A **lithium secondary battery** comprising **composite polymer electrolyte** fabricated by a spray method
- L23 ANSWER 18 OF 35 CAPLUS COPYRIGHT 2004 ACS on STN  
TI Fabrication of a **lithium secondary battery** comprising a hybrid **polymer electrolyte** prepared by a spray method
- L23 ANSWER 19 OF 35 CAPLUS COPYRIGHT 2004 ACS on STN  
TI A **lithium secondary battery** comprising a porous **polymer** separator film fabricated by a spray method
- L23 ANSWER 20 OF 35 CAPLUS COPYRIGHT 2004 ACS on STN  
TI Gel **electrolytic** precursor and manufacturing of non-aqueous **secondary battery**

L17 STR

CH2:CH<sup>^</sup>C≡N  
1 2 3 4

NODE ATTRIBUTES:

DEFAULT MLEVEL IS ATOM

DEFAULT ECLEVEL IS LIMITED

GRAPH ATTRIBUTES:

RING(S) ARE ISOLATED OR EMBEDDED

NUMBER OF NODES IS 4

STEREO ATTRIBUTES: NONE

L19 17649 SEA FILE=REGISTRY SSS FUL L17 AND (L5 OR L6) AND L9 AND L14  
L20 35 SEA FILE=CAPLUS ABB=ON PLU=ON L19 AND L11 AND (L12 OR L13)  
L23 35 SEA FILE=CAPLUS ABB=ON PLU=ON L20 AND (COMPOSIT? OR POLYMER?  
OR ELECTROLY? OR ELECTROCHEM? OR BATTER? OR LITHIUM?)

=> d ti 1-35

L23 ANSWER 1 OF 35 CAPLUS COPYRIGHT 2004 ACS on STN  
TI Rechargeable **composite polymer battery** with  
high energy density

L23 ANSWER 2 OF 35 CAPLUS COPYRIGHT 2004 ACS on STN  
TI Chemical sensors utilizing conducting **polymer  
compositions**

L23 ANSWER 3 OF 35 CAPLUS COPYRIGHT 2004 ACS on STN  
TI Method for producing cathode for **lithium-sulfur battery**

L23 ANSWER 4 OF 35 CAPLUS COPYRIGHT 2004 ACS on STN  
TI Understanding of Effects of Nano-Al2O3 Particles on Ionic Conductivity of  
**Composite Polymer Electrolytes**

L23 ANSWER 5 OF 35 CAPLUS COPYRIGHT 2004 ACS on STN  
TI Stable high-voltage **composite polymer  
electrolytes** for secondary lithium nonaqueous-  
**electrolyte batteries**

L23 ANSWER 6 OF 35 CAPLUS COPYRIGHT 2004 ACS on STN  
TI **Polymer electrolyte** comprising fluoride copolymer for  
**lithium battery**

L23 ANSWER 7 OF 35 CAPLUS COPYRIGHT 2004 ACS on STN  
TI **Battery** structures, self-organizing structures, and related  
methods

L23 ANSWER 8 OF 35 CAPLUS COPYRIGHT 2004 ACS on STN  
TI Solid **composite polymer electrolyte** for



PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
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US 2004040841	A1	20040304	US 2002-234980	20020904
PRIORITY APPLN. INFO.:			US 2002-234980	20020904

IT 9003-56-9, Polyacrylonitrile-butadiene-styrene 9010-76-8  
, Polyvinylidene chloride-acrylonitrile  
RL: ARG (Analytical reagent use); DEV (Device component use); ANST  
(Analytical study); USES (Uses)  
(chemical vapor sensing and identification by gas sensors based on  
conducting **polymer compns.**)

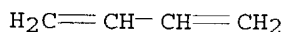
RN 9003-56-9 CAPLUS

CN 2-Propenenitrile, polymer with 1,3-butadiene and ethenylbenzene (9CI) (CA  
INDEX NAME)

CRN 107-13-1  
CMF C3 H3 N



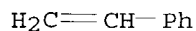
<05/21/2004> KOROMA - EIC 1700



CM 3

CRN 100-42-5

CMF C8 H8



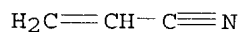
RN 9010-76-8 CAPLUS

CN 2-Propenenitrile, polymer with 1,1-dichloroethene (9CI) (CA INDEX NAME)

CM 1

CRN 107-13-1

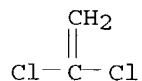
CMF C3 H3 N



CM 2

CRN 75-35-4

CMF C2 H2 Cl2



IT 1344-28-1, Alumina, analysis

RL: ARU (Analytical role, unclassified); DEV (Device component use); ANST (Analytical study); USES (Uses)  
(chemical vapor sensing and identification by gas sensors based on conducting **polymer compns.**)

RN 1344-28-1 CAPLUS

CN Aluminum oxide (Al2O3) (8CI, 9CI) (CA INDEX NAME)

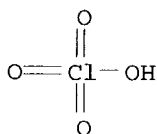
\*\*\* STRUCTURE DIAGRAM IS NOT AVAILABLE \*\*\*

IT 7791-03-9, Lithium perchlorate

RL: ARU (Analytical role, unclassified); DEV (Device component use); MOA (Modifier or additive use); ANST (Analytical study); USES (Uses)  
(chemical vapor sensing and identification by gas sensors based on conducting **polymer compns.**)

RN 7791-03-9 CAPLUS

CN Perchloric acid, lithium salt (8CI, 9CI) (CA INDEX NAME)



● Li

IC ICM G01N027-26  
 NCL 204406000  
 CC 79-2 (Inorganic Analytical Chemistry)  
 Section cross-reference(s): 38, 59, 80  
 ST conducting **polymer** gas sensor  
 IT Polyamides, uses  
 RL: ARG (Analytical reagent use); DEV (Device component use); ANST  
 (Analytical study); USES (Uses)  
 (acrylic; chemical vapor sensing and identification by gas sensors based  
 on conducting **polymer compns.**)  
 IT Polycarbonates, uses  
 RL: ARG (Analytical reagent use); DEV (Device component use); ANST  
 (Analytical study); USES (Uses)  
 (bisphenol-based; chemical vapor sensing and identification by gas sensors  
 based on conducting **polymer compns.**)  
 IT Chemical warfare agents  
 Computers  
 Conducting **polymers**  
 Dopants  
 Electric circuits  
 Electric resistance  
 Gas analysis  
 Gas sensors  
 Heaters  
 Memory devices  
 Odor and Odorous substances  
 Printed circuit boards  
 Thermocouples  
 Vapors  
 (chemical vapor sensing and identification by gas sensors based on  
 conducting **polymer compns.**)  
 IT Volatile organic compounds  
 RL: ANT (Analyte); ANST (Analytical study)  
 (chemical vapor sensing and identification by gas sensors based on  
 conducting **polymer compns.**)  
 IT Fluoropolymers, uses  
 Polyamides, uses  
 Polyanilines  
 Polyesters, uses

Polyoxyalkylenes, uses  
Polyoxymethylenes, uses  
Polysulfones, uses  
Polyvinyl butyrals

RL: ARG (Analytical reagent use); DEV (Device component use); ANST  
(Analytical study); USES (Uses)  
(chemical vapor sensing and identification by gas sensors based on  
conducting **polymer compns.**)

IT Toxicants  
(industrial; chemical vapor sensing and identification by gas sensors  
based on conducting **polymer compns.**)

IT Electrodes  
(interdigitated; chemical vapor sensing and identification by gas sensors  
based on conducting **polymer compns.**)

IT Acrylic **polymers**, uses  
RL: ARG (Analytical reagent use); DEV (Device component use); ANST  
(Analytical study); USES (Uses)  
(polyamide-; chemical vapor sensing and identification by gas sensors  
based on conducting **polymer compns.**)

IT 50-00-0, Formaldehyde, analysis 56-23-5, Tetrachloromethane, analysis  
64-17-5, Ethanol, analysis 67-56-1, Methanol, analysis 67-64-1,  
Acetone, analysis 67-66-3, Chloroform, analysis 71-43-2, Benzene,  
analysis 79-01-6, Trichloroethylene, analysis 108-88-3, Toluene,  
analysis 683-08-9, Diethylmethyl phosphonate 693-07-2, 2-Chloroethyl  
ethyl sulfide 756-79-6, Dimethylmethyl phosphonate 5535-49-9,  
2-Chloroethyl phenyl sulfide 7664-41-7, Ammonia, analysis 7732-18-5,  
Water, analysis  
RL: ANT (Analyte); ANST (Analytical study)  
(chemical vapor sensing and identification by gas sensors based on  
conducting **polymer compns.**)

IT 9002-84-0, Polytetrafluoroethylene 9002-86-2, Poly vinyl chloride  
9002-88-4, Polyethylene 9002-89-5, Poly vinyl alcohol 9003-01-4,  
Polyacrylic acid 9003-07-0, Polypropylene 9003-07-0D, Polypropylene,  
chlorinated 9003-20-7, Poly vinyl acetate 9003-39-8, Poly  
N-vinylpyrrolidone 9003-42-3, Polyethyl methacrylate 9003-53-6D,  
Polystyrene, chlorinated 9003-56-9, Polyacrylonitrile-butadiene-  
styrene 9003-63-8, Poly-n-butyl methacrylate 9006-26-2,  
Polyethylene-maleic anhydride 9008-66-6, Polyhexamethylenesecbacamide  
9010-76-8, Polyvinylidene chloride-acrylonitrile 9010-77-9,  
Polyethylene-acrylic acid 9011-06-7, Polyvinylidene chloride-vinyl  
chloride 9011-13-6, Polystyrene/maleic anhydride 9011-14-7, Polymethyl  
methacrylate 9011-15-8, Poly-isobutyl methacrylate 9011-16-9, Poly  
vinyl methyl ether-maleic anhydride 9011-52-3 9011-53-4, Poly-n-butyl  
methacrylate-isobutyl methacrylate 24936-74-1 24937-16-4,  
Polylauro lactam 24937-78-8, Polyethylenevinyl acetate 24937-79-9,  
Polyvinylidene fluoride 24979-70-2, Poly-4-vinylphenol 24980-41-4,  
Poly caprolactone 25014-31-7, Poly- $\alpha$ -methylstyrene 25038-54-4,  
Poly caprolactam, uses 25038-74-8, Polylauro lactam 25119-62-4,  
Polystyrene-allyl alcohol 25233-30-1, Polyaniline 25233-34-5,  
Polythiophene 25248-42-4, Poly caprolactone 25322-68-3, Polyethylene  
oxide 26098-55-5, Polyhexamethylenedodecanediamide 28158-18-1  
30604-81-0, Polypyrrole 32131-17-2, Polyhexamethylene adipamide, uses

59049-12-6 479355-50-5

RL: ARG (Analytical reagent use); DEV (Device component use); ANST  
(Analytical study); USES (Uses)

(chemical vapor sensing and identification by gas sensors based on  
conducting **polymer compns.**)

IT 1344-28-1, Alumina, analysis 7440-32-6, Titanium, analysis

RL: ARU (Analytical role, unclassified); DEV (Device component use); ANST  
(Analytical study); USES (Uses)

(chemical vapor sensing and identification by gas sensors based on  
conducting **polymer compns.**)

IT 127-68-4, 3-Nitrobenzenesulfonic acid sodium salt 131-08-8,  
Anthraquinone-2-sulfonic acid sodium salt 3144-16-9, Camphorsulfonic  
acid 5324-84-5, 1-Octanesulfonic acid sodium salt 6149-03-7,  
4-Octylbenzenesulfonic acid sodium salt 6192-52-5, p-Toluenesulfonic  
acid monohydrate 7791-03-9, **Lithium** perchlorate

RL: ARU (Analytical role, unclassified); DEV (Device component use); MOA  
(Modifier or additive use); ANST (Analytical study); USES (Uses)

(chemical vapor sensing and identification by gas sensors based on  
conducting **polymer compns.**)

L23 ANSWER 3 OF 35 CAPLUS COPYRIGHT 2004 ACS on STN

ACCESSION NUMBER: 2004:119840 CAPLUS

DOCUMENT NUMBER: 140:149223

TITLE: Method for producing cathode for **lithium**  
-sulfur **battery**

INVENTOR(S): Hwang, Duck-chul; Park, Zin; Lee, Jae-woan

PATENT ASSIGNEE(S): Samsung SDI Co., Ltd., S. Korea

SOURCE: U.S. Pat. Appl. Publ., 11 pp.

CODEN: USXXCO

DOCUMENT TYPE: Patent

LANGUAGE: English

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
US 2004029014	A1	20040212	US 2003-634748	20030806
JP 2004071566	A2	20040304	JP 2003-283959	20030731

PRIORITY APPLN. INFO.: KR 2002-46581 A 20020807

AB The invention concerns a pos. electrode of a **lithium-sulfur**  
**battery**, a method of producing the same, and a **lithium**  
-sulfur **battery** include, as the pos. electrode, a current  
collector, a pos. active material layer on the current collector, and a  
**polymer** layer on the pos. active material on the current  
collector.

IT 9003-56-9

RL: DEV (Device component use); USES (Uses)

(abs rubber, method for producing cathode for **lithium-sulfur**  
**battery**)

RN 9003-56-9 CAPLUS

CN 2-Propenenitrile, polymer with 1,3-butadiene and ethenylbenzene (9CI) (CA  
INDEX NAME)

*pat*

CM 1

CRN 107-13-1

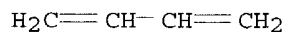
CMF C3 H3 N



CM 2

CRN 106-99-0

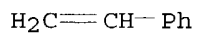
CMF C4 H6



CM 3

CRN 100-42-5

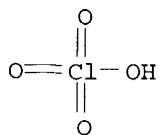
CMF C8 H8



IT 1344-28-1, Alumina, uses  
RL: DEV (Device component use); USES (Uses)  
(colloidal; method for producing cathode for **lithium-sulfur battery**)  
RN 1344-28-1 CAPLUS  
CN Aluminum oxide (Al<sub>2</sub>O<sub>3</sub>) (8CI, 9CI) (CA INDEX NAME)

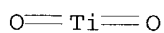
\*\*\* STRUCTURE DIAGRAM IS NOT AVAILABLE \*\*\*

IT 7791-03-9, **Lithium** perchlorate 13463-67-7,  
Titanium oxide, uses 25014-41-9, Polyacrylonitrile  
RL: DEV (Device component use); USES (Uses)  
(method for producing cathode for **lithium-sulfur battery**)  
RN 7791-03-9 CAPLUS  
CN Perchloric acid, lithium salt (8CI, 9CI) (CA INDEX NAME)



● Li

RN 13463-67-7 CAPLUS  
CN Titanium oxide (TiO<sub>2</sub>) (8CI, 9CI) (CA INDEX NAME)

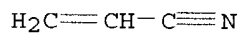


RN 25014-41-9 CAPLUS  
CN 2-Propenenitrile, homopolymer (9CI) (CA INDEX NAME)

CM 1

CRN 107-13-1

CMF C3 H3 N

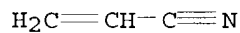


IT 9003-18-3  
RL: DEV (Device component use); USES (Uses)  
(nitrile rubber, method for producing cathode for lithium  
-sulfur **battery**)  
RN 9003-18-3 CAPLUS  
CN 2-Propenenitrile, polymer with 1,3-butadiene (9CI) (CA INDEX NAME)

CM 1

CRN 107-13-1

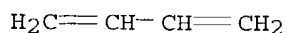
CMF C3 H3 N



CM 2

CRN 106-99-0

CMF C4 H6



IC ICM H01M002-16  
ICS H01M004-60; H01M004-58  
NCL 429246000; 429251000; 429252000; 429218100; 429213000  
CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
Section cross-reference(s): 38  
ST cathode **lithium** sulfur **battery**  
IT Polyurethanes, uses  
RL: TEM (Technical or engineered material use); USES (Uses)  
(acrylates, ethoxylated; method for producing cathode for  
**lithium-sulfur battery**)  
IT Styrene-butadiene rubber, uses  
RL: DEV (Device component use); USES (Uses)  
(hydrogenated, block, triblock, sulfonated; method for producing  
cathode for **lithium-sulfur battery**)  
IT Primary **batteries**  
(**lithium**; method for producing cathode for **lithium**  
-sulfur **battery**)  
IT **Battery** cathodes  
(method for producing cathode for **lithium-sulfur**  
**battery**)  
IT ABS rubber  
Fluoropolymers, uses  
Nitrile rubber, uses  
Polyolefins  
Polyoxyalkylenes, uses  
Styrene-butadiene rubber, uses  
RL: DEV (Device component use); USES (Uses)  
(method for producing cathode for **lithium-sulfur**  
**battery**)  
IT **Lithium** alloy, base  
RL: DEV (Device component use); USES (Uses)  
(method for producing cathode for **lithium-sulfur**  
**battery**)  
IT 9003-56-9  
RL: DEV (Device component use); USES (Uses)  
(abs rubber, method for producing cathode for **lithium-sulfur**  
**battery**)  
IT 1344-28-1, Alumina, uses 7631-86-9, Colloidal silica, uses  
RL: DEV (Device component use); USES (Uses)  
(colloidal; method for producing cathode for **lithium-sulfur**  
**battery**)  
IT 10344-93-1D, Acrylate, alkyl derivative  
RL: TEM (Technical or engineered material use); USES (Uses)  
(ethoxylated; method for producing cathode for **lithium-sulfur**  
**battery**)  
IT 110-71-4 111-96-6, Diglyme 126-33-0, Sulfolane 646-06-0,  
1,3-Dioxolane 1314-23-4, Zirconium oxide, uses 1332-29-2, Tin oxide  
1332-37-2, Iron oxide, uses 7439-93-2, **Lithium**, uses



7440-44-0, Carbon, uses 7704-34-9, Sulfur, uses 7704-34-9D, Sulfur, organic compound **7791-03-9, Lithium** perchlorate  
 9002-89-5, Polyvinyl alcohol 9003-19-4, Polyvinyl ether 9003-20-7, Polyvinyl acetate 9003-22-9, Vinyl acetate-vinyl chloride copolymer 9003-39-8, Polyvinylpyrrolidone 9004-35-7, Cellulose acetate 9010-88-2, Ethyl acrylate-methylmethacrylate copolymer 9011-17-0, Hexafluoropropylene-vinylidene fluoride copolymer 11075-35-7, Vanadium titanium oxide 11099-11-9, Vanadium oxide 11126-12-8, Iron sulfide 12673-92-6, Titanium sulfide 12789-64-9, Iron titanate **13463-67-7, Titanium** oxide, uses 14283-07-9, **Lithium** tetrafluoroborate 21324-40-3, **Lithium** hexafluorophosphate 24937-79-9, PvdF **25014-41-9, Polyacrylonitrile** 25086-89-9, Vinyl acetate-vinylpyrrolidone copolymer 25322-68-3, Peo 27360-07-2, Vinyl acetate-vinyl alcohol-divinyl butyral copolymer 29935-35-1, **Lithium** hexafluoroarsenate 33454-82-9, **Lithium** triflate 49717-87-5, 2-Propenoic acid, ion(1-) homopolymer, uses 49717-97-7, 2-Propenoic acid, 2-methyl-, ion(1-) homopolymer, uses 69822-67-9, Poly(carbon sulfide) 90076-65-6, **Lithium** bis(trifluoromethylsulfonyl)imide

RL: DEV (Device component use); USES (Uses)  
 (method for producing cathode for **lithium-sulfur battery**)

IT 7439-95-4, Magnesium, uses 7440-21-3, Silicon, uses 7440-24-6, Strontium, uses 7440-28-0, Thallium, uses 7440-36-0, Antimony, uses 7440-38-2, Arsenic, uses 7440-56-4, Germanium, uses 7440-69-9, Bismuth, uses 7440-70-2, Calcium, uses 7440-74-6, Indium, uses 7553-56-2, Iodine, uses 7726-95-6, Bromine, uses

RL: TEM (Technical or engineered material use); USES (Uses)  
 (method for producing cathode for **lithium-sulfur battery**)

IT **9003-18-3**

RL: DEV (Device component use); USES (Uses)  
 (nitrile rubber, method for producing cathode for **lithium-sulfur battery**)

IT 2223-82-7D, Neopentyl glycol diacrylate, ethoxylated 4491-03-6D, Bisphenol A diacrylate, ethoxylated 7429-90-5, Aluminum, uses 7440-39-3, Barium, uses 7440-42-8, Boron, uses 7723-14-0, Phosphorus, uses 7727-37-9, Nitrogen, uses 7782-41-4, Fluorine, uses 7782-44-7, Oxygen, uses 7782-50-5, Chlorine, uses 26570-48-9, Polyethylene glycol diacrylate 52496-08-9, Polypropylene glycol diacrylate

RL: TEM (Technical or engineered material use); USES (Uses)  
 (protective coating; method for producing cathode for **lithium-sulfur battery**)

IT 9003-55-8

RL: DEV (Device component use); USES (Uses)  
 (styrene-butadiene rubber, hydrogenated, block, triblock, sulfonated; method for producing cathode for **lithium-sulfur battery**)

IT 9003-55-8

RL: DEV (Device component use); USES (Uses)  
 (styrene-butadiene rubber, method for producing cathode for **lithium-sulfur battery**)

L23 ANSWER 4 OF 35 CAPLUS COPYRIGHT 2004 ACS on STN

ACCESSION NUMBER: 2003:765410 CAPLUS

DOCUMENT NUMBER: 140:29424

TITLE: Understanding of Effects of Nano-Al<sub>2</sub>O<sub>3</sub> Particles on  
Ionic Conductivity of **Composite  
Polymer Electrolytes**

AUTHOR(S): Wang, Zhaoxiang; Huang, Xuejie; Chen, Liquan

CORPORATE SOURCE: Institute of Physics, Laboratory for Solid State  
Ionics, Chinese Academy of Sciences, Beijing, 100080,  
Peop. Rep. China

SOURCE: Electrochemical and Solid-State Letters (2003), 6(11),  
E40-E44

CODEN: ESLEF6; ISSN: 1099-0062

PUBLISHER: Electrochemical Society

DOCUMENT TYPE: Journal

LANGUAGE: English

AB Nanosized Al<sub>2</sub>O<sub>3</sub> was added to a polyacrylonitrile-LiClO<sub>4</sub>  
**electrolyte**. IR absorption spectroscopy was used to study the  
influence of Al<sub>2</sub>O<sub>3</sub> on the ionic association in the **composite  
electrolyte**. The nano-Al<sub>2</sub>O<sub>3</sub> filler aided the dissoln. of the salt  
and the dissociation of nitrile-Li<sup>+</sup> interaction in the dry **composite**  
. Taking into account Lewis acid-base type interactions of the surface  
groups on nano-Al<sub>2</sub>O<sub>3</sub> particles with the ions and with the **polymer**  
and using exptl. results, an interpretation of the enhancement of ionic  
conductivity and transference number of the **composite polymer  
electrolyte** by the nanoscale ceramic particles, is presented.

IT 1344-28-1, Alumina, uses

RL: DEV (Device component use); MOA (Modifier or additive use); USES  
(Uses)

(effect of Al<sub>2</sub>O<sub>3</sub> nanoparticles on ionic conductivity of **composite  
polymer electrolytes** for lithium  
batteries)

RN 1344-28-1 CAPLUS

CN Aluminum oxide (Al<sub>2</sub>O<sub>3</sub>) (8CI, 9CI) (CA INDEX NAME)

\*\*\* STRUCTURE DIAGRAM IS NOT AVAILABLE \*\*\*

IT 25014-41-9, Polyacrylonitrile

RL: DEV (Device component use); USES (Uses)

(**electrolyte** containing; effect of Al<sub>2</sub>O<sub>3</sub> nanoparticles on ionic  
conductivity of **composite polymer electrolytes**  
for lithium batteries)

RN 25014-41-9 CAPLUS

CN 2-Propenenitrile, homopolymer (9CI) (CA INDEX NAME)

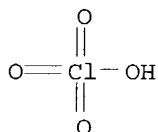
CM 1

CRN 107-13-1

CMF C3 H3 N



IT 7791-03-9, Lithium perchlorate (LiClO<sub>4</sub>)  
 RL: DEV (Device component use); USES (Uses)  
 (electrolyte; effect of Al<sub>2</sub>O<sub>3</sub> nanoparticles on ionic conductivity of  
 composite polymer electrolytes for  
 lithium batteries)  
 RN 7791-03-9 CAPLUS  
 CN Perchloric acid, lithium salt (8CI, 9CI) (CA INDEX NAME)



● Li

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
 Section cross-reference(s): 72  
 ST alumina nanoparticle composite polymer  
 electrolyte ionic cond lithium battery  
 IT Battery electrolytes  
 Ionic conductivity  
 Nanoparticles  
 Polymer electrolytes  
 (effect of Al<sub>2</sub>O<sub>3</sub> nanoparticles on ionic conductivity of composite  
 polymer electrolytes for lithium  
 batteries)  
 IT 1344-28-1, Alumina, uses  
 RL: DEV (Device component use); MOA (Modifier or additive use); USES  
 (Uses)  
 (effect of Al<sub>2</sub>O<sub>3</sub> nanoparticles on ionic conductivity of composite  
 polymer electrolytes for lithium  
 batteries)  
 IT 25014-41-9, Polyacrylonitrile  
 RL: DEV (Device component use); USES (Uses)  
 (electrolyte containing; effect of Al<sub>2</sub>O<sub>3</sub> nanoparticles on ionic  
 conductivity of composite polymer electrolytes  
 for lithium batteries)  
 IT 7791-03-9, Lithium perchlorate (LiClO<sub>4</sub>)  
 RL: DEV (Device component use); USES (Uses)  
 (electrolyte; effect of Al<sub>2</sub>O<sub>3</sub> nanoparticles on ionic conductivity of  
 composite polymer electrolytes for  
 lithium batteries)  
 REFERENCE COUNT: 31 THERE ARE 31 CITED REFERENCES AVAILABLE FOR THIS  
 RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L23 ANSWER 5 OF 35 CAPLUS COPYRIGHT 2004 ACS on STN

ACCESSION NUMBER: 2003:591497 CAPLUS

DOCUMENT NUMBER: 139:152300

TITLE: Stable high-voltage **composite polymer electrolytes** for secondary **lithium nonaqueous-electrolyte batteries**

INVENTOR(S): Zaghib, Karim; Perrier, Michel; Guerfi, Abdelbast; Dupuis, Elisabeth; Charest, Patrick; Allaire, Francois; Armand, Michel

PATENT ASSIGNEE(S): Hydro-Quebec, Can.

SOURCE: PCT Int. Appl., 46 pp.

CODEN: PIXXD2

DOCUMENT TYPE: Patent

LANGUAGE: French

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 2003063287	A2	<u>20030731</u>	WO 2003-CA52	20030115
WO 2003063287	A3	20031204		

W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, OM, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM

RW: GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, SE, SI, SK, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG

PRIORITY APPLN. INFO.: CA 2002-2367290 A 20020116

AB A **composite polymer electrolyte** for an **electrochem. generator** (especially a secondary **lithium battery**) consists of: (1) a star-branched **polymer** with four branches containing terminating (meth)acrylate, C1-8-alkoxy, and vinyl groups, (2) polyvinylidene difluoride (mol. weight 100,000-250,000), (3) vinylidene difluoride-hexafluoropropene copolymer (mol. weight 100,000-250,000), (4) PTFE (mol. weight 200,000), (5) ethylene-propylene-5-methylene-2-norbornene copolymer or EPDM rubber, (6) polyvinyl alc. or a substituted polyvinyl alc., (7) poly(C2-3-alkoxylated) glycerol or trimethylolpropane, crosslinked and isocyanate-terminated, (8) poly(Me methacrylate) (mol. weight 50,000-500,000), (9) polyacrylonitrile (mol. weight 20,000-200,000), (10) SiO<sub>2</sub>-Al<sub>2</sub>O<sub>3</sub>, and (11) TiO<sub>2</sub> nanoparticles, optionally coated with an organic material. The **composite polymer electrolyte**, which can be crosslinked (e.g., by radical initiators), also contains associated conducting salts, especially **lithium salts**, and organic solvents, especially carbonates, lactones, and tetra-Et sulfamide. A suitable anode for use with this **composite**

B.D.

**electrolyte** is preferably Al-Li alloy, Li<sub>4.4</sub>Sn<sub>22</sub>, Li<sub>4</sub>Ti<sub>5</sub>O<sub>12</sub>; suitable cathodes are LiCoPo<sub>4</sub> or Li(Mn<sub>0.66</sub>Ni<sub>0.34</sub>)O<sub>2</sub>.

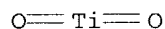
IT 1344-28-1, Alumina, uses 25014-41-9, Polyacrylonitrile  
 RL: DEV (Device component use); USES (Uses)  
 (composite polyelectrolyte containing; stable high-voltage  
 composite polymer electrolytes for  
 secondary lithium nonaq.-electrolyte  
 batteries)  
 RN 1344-28-1 CAPLUS  
 CN Aluminum oxide (Al<sub>2</sub>O<sub>3</sub>) (8CI, 9CI) (CA INDEX NAME)

\*\*\* STRUCTURE DIAGRAM IS NOT AVAILABLE \*\*\*  
 RN 25014-41-9 CAPLUS  
 CN 2-Propenenitrile, homopolymer (9CI) (CA INDEX NAME)

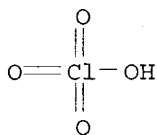
CM 1  
 CRN 107-13-1  
 CMF C3 H3 N



IT 13463-67-7, Titania, uses  
 RL: DEV (Device component use); USES (Uses)  
 (nanocryst., composite polyelectrolyte containing; stable  
 high-voltage composite polymer electrolytes  
 for secondary lithium nonaq.-electrolyte  
 batteries)  
 RN 13463-67-7 CAPLUS  
 CN Titanium oxide (TiO<sub>2</sub>) (8CI, 9CI) (CA INDEX NAME)



IT 7791-03-9, Lithium perchlorate  
 RL: DEV (Device component use); USES (Uses)  
 (nonaq. electrolyte containing; stable high-voltage  
 composite polymer electrolytes for  
 secondary lithium nonaq.-electrolyte  
 batteries)  
 RN 7791-03-9 CAPLUS  
 CN Perchloric acid, lithium salt (8CI, 9CI) (CA INDEX NAME)



● Li

IC ICM H01M010-40  
ICS H01G009-02; C08F290-06; C08G065-329

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
Section cross-reference(s): 38

ST high voltage stable **polymer battery electrolyte composite**; star branched **polymer battery electrolyte composite**; EPDM rubber **polymer battery electrolyte composite**; nonaq **battery electrolyte composite polymer**

IT EPDM rubber  
Fluoropolymers, uses  
RL: DEV (Device component use); USES (Uses)  
(**composite polyelectrolyte containing**; stable high-voltage **composite polymer electrolytes** for secondary lithium nonaq.-**electrolyte batteries**)

IT Polyanilines  
RL: DEV (Device component use); USES (Uses)  
(conducting; stable high-voltage **composite polymer electrolytes** for secondary lithium nonaq.-**electrolyte batteries**)

IT **Battery electrolytes**  
(nonaq.; stable high-voltage **composite polymer electrolytes** for secondary lithium nonaq.-**electrolyte batteries**)

IT Conducting **polymers**  
(polythiophenes; stable high-voltage **composite polymer electrolytes** for secondary lithium nonaq.-**electrolyte batteries**)

IT **Battery anodes**  
Battery cathodes  
Polymer electrolytes  
(stable high-voltage **composite polymer electrolytes** for secondary lithium nonaq.-**electrolyte batteries**)

IT Acrylic polymers, uses  
Polymers, uses  
RL: DEV (Device component use); USES (Uses)  
(star-branched; stable high-voltage **composite polymer electrolytes** for secondary lithium nonaq.-

- electrolyte batteries)**
- IT Capacitor electrodes  
(supercapacitors; stable high-voltage **composite polymer electrolytes** for secondary **lithium nonaq.-electrolyte batteries**)
- IT **Lithium** alloy, base  
RL: DEV (Device component use); USES (Uses)  
(**battery anode**; stable high-voltage **composite polymer electrolytes** for secondary **lithium nonaq.-electrolyte batteries**)
- IT 12031-95-7, **Lithium** titanium oxide (Li<sub>4</sub>Ti<sub>5</sub>O<sub>12</sub>) 37197-42-5  
143295-45-8  
RL: DEV (Device component use); USES (Uses)  
(**battery anode**; stable high-voltage **composite polymer electrolytes** for secondary **lithium nonaq.-electrolyte batteries**)
- IT 13824-63-0, Cobalt **lithium** phosphate (CoLiPO<sub>4</sub>) 569361-59-7,  
**Lithium** manganese nickel oxide (LiMn<sub>0.66</sub>Ni<sub>0.34</sub>O<sub>2</sub>)  
RL: DEV (Device component use); USES (Uses)  
(**battery cathode**; stable high-voltage **composite polymer electrolytes** for secondary **lithium nonaq.-electrolyte batteries**)
- IT 56-81-5D, Glycerol, poly(C2-3-alkoxylated) derivs., isocyanate-terminated  
77-99-6D, Trimethylolpropane, poly(C2-3-alkoxylated) derivs.,  
isocyanate-terminated **1344-28-1**, Alumina, uses 7631-86-9,  
Silica, uses 9002-84-0, PTFE 9002-89-5, Polyvinyl alcohol  
9002-89-5D, Polyvinyl alcohol, O-derivs. 9011-14-7, Polymethyl  
methacrylate 9011-17-0 24937-79-9, Polyvinylidene difluoride  
**25014-41-9**, Polyacrylonitrile 25034-77-9 570375-13-2, Elexcel  
MP 210-1  
RL: DEV (Device component use); USES (Uses)  
(**composite polyelectrolyte** containing; stable high-voltage  
**composite polymer electrolytes** for  
secondary **lithium nonaq.-electrolyte batteries**)
- IT **13463-67-7**, Titania, uses  
RL: DEV (Device component use); USES (Uses)  
(nanocryst., **composite polyelectrolyte** containing; stable  
high-voltage **composite polymer electrolytes**  
for secondary **lithium nonaq.-electrolyte batteries**)
- IT 96-48-0,  $\gamma$ -Butyrolactone 96-49-1, Ethylene carbonate 105-58-8,  
Diethyl carbonate 108-32-7, Propylene carbonate 616-38-6, Dimethyl  
carbonate 623-53-0, Methyl ethyl carbonate 2832-49-7, Tetraethyl  
sulfamide **7791-03-9**, **Lithium** perchlorate 14283-07-9,  
**Lithium** tetrafluoroborate 21324-40-3, **Lithium**  
hexafluorophosphate 29935-35-1, **Lithium** hexafluoroarsenate  
33454-82-9, **Lithium** trifluoromethanesulfonate 90076-65-6  
132404-42-3  
RL: DEV (Device component use); USES (Uses)  
(**nonaq. electrolyte** containing; stable high-voltage  
**composite polymer electrolytes** for

secondary lithium nonaq.-electrolyte  
batteries)

L23 ANSWER 6 OF 35 CAPLUS COPYRIGHT 2004 ACS on STN  
 ACCESSION NUMBER: 2003:511916 CAPLUS  
 DOCUMENT NUMBER: 139:71608  
 TITLE: **Polymer electrolyte** comprising  
 fluoride copolymer for **lithium  
 battery**  
 INVENTOR(S): Hwang, Seung-Sik; Cho, Myung-Dong  
 PATENT ASSIGNEE(S): S. Korea  
 SOURCE: U.S. Pat. Appl. Publ., 20 pp.  
 CODEN: USXXCO  
 DOCUMENT TYPE: Patent  
 LANGUAGE: English  
 FAMILY ACC. NUM. COUNT: 1  
 PATENT INFORMATION:



PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
US 2003124431	A1	20030703	US 2002-238714	20020911
CN 1412236	A	20030423	CN 2002-127041	20020726
JP 2003201319	A2	20030718	JP 2002-302629	20021017

PRIORITY APPLN. INFO.: KR 2001-63952 A 20011017

AB Provided are a fluoride copolymer, a **polymer electrolyte** comprising the fluoride copolymer, and a **lithium battery** employing the **polymer electrolyte**. The **polymer electrolyte** preferably includes as the fluoride copolymer at least one fluoride **polymer** selected from a polyethylene glycol methylether (meth)acrylate (PEGMA)-2,2,2-trifluoroethylacrylate (TFEA) **polymer**, a PEGMA-TFEA-acrylonitrile **polymer**, a PEGMA-TFEA-Me methacrylate **polymer**, a PEGMA-TFEA-vinylpyrrolidone **polymer**, a PEGMA-TFEA-trimethoxyvinylsilane **polymer**, and a PEGMA-TFEA-ethoxy ethylacrylate **polymer**.

IT 1344-28-1, Alumina, uses  
 RL: MOA (Modifier or additive use); USES (Uses)  
 (filler; **polymer electrolyte** comprising fluoride copolymer for **lithium battery**)

RN 1344-28-1 CAPLUS

CN Aluminum oxide (Al2O3) (8CI, 9CI) (CA INDEX NAME)

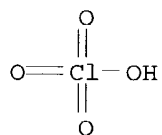
\*\*\* STRUCTURE DIAGRAM IS NOT AVAILABLE \*\*\*

IT 7791-03-9, Lithium perchlorate  
 RL: DEV (Device component use); USES (Uses)  
 (**polymer electrolyte** comprising fluoride copolymer for **lithium battery**)

RN 7791-03-9 CAPLUS

CN Perchloric acid, lithium salt (8CI, 9CI) (CA INDEX NAME)





● Li

IT 551936-02-8P

RL: DEV (Device component use); PRP (Properties); SPN (Synthetic preparation); PREP (Preparation); USES (Uses)  
(polymer electrolyte comprising fluoride copolymer for lithium battery)

RN 551936-02-8 CAPLUS

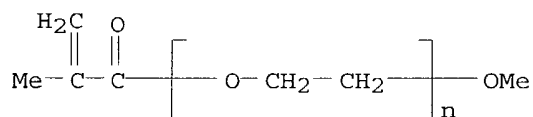
CN 2-Propenoic acid, 2,2,2-trifluoroethyl ester, polymer with  $\alpha$ -(2-methyl-1-oxo-2-propenyl)- $\omega$ -methoxypoly(oxy-1,2-ethanediyl) and 2-propenenitrile (9CI) (CA INDEX NAME)

CM 1

CRN 26915-72-0

CMF (C2 H4 O)<sub>n</sub> C5 H8 O2

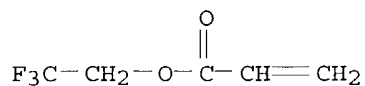
CCI PMS



CM 2

CRN 407-47-6

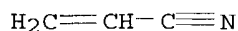
CMF C5 H5 F3 O2



CM 3

CRN 107-13-1

CMF C3 H3 N



IC ICM H01M010-40  
ICS C08J005-20; C08F018-20

NCL 429316000; 429317000; 429309000; 429307000; 528401000; 521025000;  
526246000

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
Section cross-reference(s): 38

ST **polymer electrolyte fluoride copolymer lithium battery**

IT Ceramics  
(filler; **polymer electrolyte** comprising fluoride copolymer for **lithium battery**)

IT Zeolites (synthetic), uses  
RL: MOA (Modifier or additive use); USES (Uses)  
(filler; **polymer electrolyte** comprising fluoride copolymer for **lithium battery**)

IT Secondary **batteries**  
(**lithium**; **polymer electrolyte** comprising fluoride copolymer for **lithium battery**)

IT **Battery electrolytes**  
Ionic conductivity  
Mechanical properties  
(**polymer electrolyte** comprising fluoride copolymer for **lithium battery**)

IT Fluoropolymers, uses  
RL: DEV (Device component use); PRP (Properties); SPN (Synthetic preparation); PREP (Preparation); USES (Uses)  
(**polymer electrolyte** comprising fluoride copolymer for **lithium battery**)

IT **1344-28-1**, Alumina, uses 7631-86-9, Silica, uses 37220-89-6, **Lithium** aluminate  
RL: MOA (Modifier or additive use); USES (Uses)  
(filler; **polymer electrolyte** comprising fluoride copolymer for **lithium battery**)

IT 96-48-0,  $\gamma$ -Butyrolactone 96-49-1, Ethylene carbonate 108-32-7, Propylene carbonate 110-71-4 111-96-6, Diethylene glycol dimethyl ether 126-33-0, Sulfolane 143-24-8, Tetraethylene glycol dimethyl ether 616-38-6, Dimethyl carbonate 623-53-0, Ethyl methyl carbonate 623-96-1, Dipropyl carbonate 646-06-0, Dioxolane 7439-93-2, **Lithium**, uses 7440-44-0, Carbon, uses 7704-34-9, Sulfur, uses 7782-42-5, Graphite, uses 7791-03-9, **Lithium** perchlorate 12057-17-9, **Lithium** manganese oxide  $\text{LiMn}_2\text{O}_4$  12162-79-7, **Lithium** manganese oxide  $\text{LiMnO}_2$  12190-79-3, Cobalt **lithiumoxide**  $\text{CoLiO}_2$  14283-07-9, **Lithium** tetrafluoroborate 21324-40-3, **Lithium** hexafluorophosphate 24991-55-7, Polyethylene glycol dimethyl ether 33454-82-9, **Lithium** triflate 73506-93-1, Diethoxyethane 90076-65-6  
RL: DEV (Device component use); USES (Uses)  
(**polymer electrolyte** comprising fluoride copolymer

for lithium battery)

IT 551936-01-7P 551936-02-8P 551936-03-9P 551936-04-0P  
551936-05-1P 551936-06-2P

RL: DEV (Device component use); PRP (Properties); SPN (Synthetic preparation); PREP (Preparation); USES (Uses)

(polymer electrolyte comprising fluoride copolymer  
for lithium battery)

L23 ANSWER 7 OF 35 CAPLUS COPYRIGHT 2004 ACS on STN

ACCESSION NUMBER: 2003:118181 CAPLUS

DOCUMENT NUMBER: 138:156304

TITLE: **Battery** structures, self-organizing  
structures, and related methods

INVENTOR(S): Chiang, Yet-Ming; Moorehead, William Douglas; Holman,  
Richard K.; Viola, Michael S.; Gozdz, Antoni S.;  
Loxley, Andrew; Riley, Gilbert N., Jr.

PATENT ASSIGNEE(S): Massachusetts Institute of Technology, USA; A123  
Systems

SOURCE: PCT Int. Appl., 138 pp.

CODEN: PIXXD2

DOCUMENT TYPE: Patent

LANGUAGE: English

FAMILY ACC. NUM. COUNT: 4

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 2003012908	A2	20030213	WO 2002-US23880	20020726
WO 2003012908	C1	20040219		
WO 2003012908	C2	20040325		

W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN,  
CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH,  
GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR,  
LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, OM, PH,  
PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TN, TR, TT, TZ,  
UA, UG, UZ, VN, YU, ZA, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM  
RW: GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW, AT, BE, BG,  
CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL,  
PT, SE, SK, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR,  
NE, SN, TD, TG

US 2003082446	A1	20030501	US 2001-21740	20011022
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PRIORITY APPLN. INFO.:	US 2001-308360P	P	20010727
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US 2001-21740	A	20011022
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US 2000-242124P	P	20001020
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AB An energy storage device includes a first electrode comprising a first material and a second electrode comprising a second material, at least a portion of the first and second materials forming an interpenetrating network when dispersed in an **electrolyte**, the **electrolyte**, the first material and the second material are selected so that the first and second materials exert a repelling force on each other when combined. An **electrochem.** device, includes a first electrode in elec. communication with a first current collector; a

second electrode in elec. communication with a second current collector; and an ionically conductive medium in ionic contact with the first and second electrodes, wherein at least a portion of the first and second electrodes form an interpenetrating network and wherein at least one of the first and second electrodes comprises an electrode structure providing two or more pathways to its current collector.

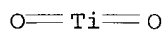
IT 13463-67-7, Titanium oxide, uses 25014-41-9, Polyacrylonitrile

RL: DEV (Device component use); USES (Uses)

(**battery** structures, self-organizing structures, and related methods)

RN 13463-67-7 CAPLUS

CN Titanium oxide (TiO2) (8CI, 9CI) (CA INDEX NAME)



RN 25014-41-9 CAPLUS

CN 2-Propenenitrile, homopolymer (9CI) (CA INDEX NAME)

CM 1

CRN 107-13-1

CMF C3 H3 N



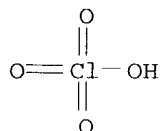
IT 7791-03-9, **Lithium** perchlorate

RL: MOA (Modifier or additive use); USES (Uses)

(**electrolyte**, cog. polyethylene oxide; **battery** structures, self-organizing structures, and related methods)

RN 7791-03-9 CAPLUS

CN Perchloric acid, lithium salt (8CI, 9CI) (CA INDEX NAME)



IC ICM H01M010-04

ICS H01M010-40; H01M004-04; H01M004-02; H01B009-00; G02F001-00

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
Section cross-reference(s): 38, 72

ST **battery** structure self organizing structure  
IT Phosphazenes  
RL: DEV (Device component use); USES (Uses)  
((methoxyethoxy)ethoxy; **battery** structures, self-organizing  
structures, and related methods)  
IT **Battery** anodes  
    **Battery** cathodes  
    Conducting **polymers**  
    Embossing  
    Encapsulants  
    Ink-jet printing  
    Lithography  
    **Polymer electrolytes**  
    Primary **batteries**  
    Screen printing  
        (**battery** structures, self-organizing structures, and related  
        methods)  
IT Fluoropolymers, uses  
Polyamines  
Polyimides, uses  
Polyoxyalkylenes, uses  
RL: DEV (Device component use); USES (Uses)  
    (**battery** structures, self-organizing structures, and related  
    methods)  
IT Polyesters, uses  
RL: TEM (Technical or engineered material use); USES (Uses)  
    (**battery** structures, self-organizing structures, and related  
    methods)  
IT Polyesters, uses  
RL: TEM (Technical or engineered material use); USES (Uses)  
    (**battery** structures, self-organizing structures, and related  
    methods)  
IT Glass, uses  
RL: DEV (Device component use); USES (Uses)  
    (bismuth **lithium** borate; **battery** structures,  
    self-organizing structures, and related methods)  
IT **Polymers**, uses  
RL: DEV (Device component use); USES (Uses)  
    (block, **lithium** salt-doped, **electrolyte**;  
    **battery** structures, self-organizing structures, and related  
    methods)  
IT Electric apparatus  
    (**electrochem.**; **battery** structures, self-organizing  
    structures, and related methods)  
IT Polyoxyalkylenes, uses  
RL: MOA (Modifier or additive use); USES (Uses)  
    (**lithium** complexes, perchlorate- or triflate-containing;  
    **battery** structures, self-organizing structures, and related  
    methods)  
IT Secondary **batteries**  
    (**lithium**; **battery** structures, self-organizing  
    structures, and related methods)

IT **Composites**  
(nanocomposite; **battery** structures, self-organizing structures, and related methods)

IT Printing (nonimpact)  
(stenciling; **battery** structures, self-organizing structures, and related methods)

IT Molding  
(tape-casting; **battery** structures, self-organizing structures, and related methods)

IT Coating process  
(web; **battery** structures, self-organizing structures, and related methods)

IT 7439-95-4, Magnesium, uses  
RL: MOA (Modifier or additive use); USES (Uses)  
(CoLiO<sub>2</sub> doped with; **battery** structures, self-organizing structures, and related methods)

IT 7440-03-1, Niobium, uses 7440-25-7, Tantalum, uses 7440-32-6, Titanium, uses 7440-33-7, Tungsten, uses  
RL: MOA (Modifier or additive use); USES (Uses)  
(FeLiPO<sub>4</sub> doped with; **battery** structures, self-organizing structures, and related methods)

IT 7429-90-5, Aluminum, uses  
RL: MOA (Modifier or additive use); USES (Uses)  
(LiMnO<sub>2</sub> doped with; **battery** structures, self-organizing structures, and related methods)

IT 68-12-2, n,n-Dimethylformamide, uses 75-11-6, Diiodomethane 96-49-1, Ethylene carbonate 105-58-8, Diethyl carbonate 108-32-7, Propylene carbonate 616-38-6, Dimethyl carbonate 627-31-6, 1,3-Diiodopropane 1307-96-6, Cobalt oxide coo, uses 1313-13-9, Manganese oxide mno<sub>2</sub>, uses 1313-99-1, Nickel oxide nio, uses 1314-23-4, Zirconium oxide, uses 1314-62-1, Vanadia, uses 1317-34-6, Manganese oxide mn<sub>2</sub>o<sub>3</sub> 1317-35-7, Manganese oxide mn<sub>3</sub>o<sub>4</sub> 1335-25-7, Lead oxide 1344-43-0, Manganese oxidemno, uses 1345-25-1, Iron oxide feo, uses 7226-23-5 7439-93-2, **Lithium**, uses 7439-93-2D, **Lithium**, intercalation compound 7440-21-3, Silicon, uses 7440-22-4, Silver, uses 7440-31-5, Tin, uses 7440-36-0, Antimony, uses 7440-42-8, Boron, uses 7440-44-0, Carbon, uses 7440-56-4, Germanium, uses 7440-66-6, Zinc, uses 7440-69-9, Bismuth, uses 7782-42-5, Graphite, uses 9002-84-0, Ptfе 9003-53-6, Polystyrene 10361-43-0, Bismuth hydroxide 12002-78-7 12031-65-1, **Lithium** nickel oxide linio<sub>2</sub> 12037-30-8, Vanadium oxide v6o11 12042-37-4, Alli 12048-27-0, Bili 12057-17-9, **Lithium** manganese oxide limn<sub>2</sub>o<sub>4</sub> 12057-22-6, Liza 12057-30-6 12057-33-9 12063-07-9, Iron **lithium** oxide fe<sub>2</sub>lio<sub>4</sub> 12162-79-7, **Lithium** manganese oxide limno<sub>2</sub> 12190-79-3, Cobalt **lithium** oxide colio<sub>2</sub> 12253-44-0 12338-02-2 12651-23-9, Titanium hydroxide 13463-67-7, Titanium oxide, uses 14475-63-9, Zirconium hydroxide 15365-14-7, Iron **lithium** phosphate felipo<sub>4</sub> 18282-10-5, Tin dioxide 21324-40-3, **Lithium** hexafluorophosphate 21651-19-4, Tin oxide sno 24937-79-9, Polyvinylidene fluoride 25014-41-9, Polyacrylonitrile 25322-68-3, Peo 25322-69-4, Polypropylene oxide 37217-08-6, **Lithium** titanium oxide liti<sub>2</sub>o<sub>4</sub> 39345-91-0, Lead hydroxide

50851-57-5 53262-48-9 53640-36-1 55575-96-7, **Lithium**  
silicide Li13Si4 55608-41-8 56627-44-2 61812-08-6, **Lithium**  
silicide Li21Si8 66403-10-9, **Lithium** boride (Li5B4)  
67070-82-0 71012-86-7, **Lithium** boride (Li7B6) 74083-26-4  
76036-33-4, **Lithium** silicide Li12Si7 106494-93-3,  
**Lithium** silicide Li21Si5 126213-51-2, Poly(3,4-  
ethylenedioxythiophene) 136511-06-3, MEEP 144419-56-7, Cobalt  
**lithium** magnesium oxide Co0.95LiMg0.05O2 496816-56-9  
496816-57-0, Cobalt **lithium** magnesium oxide  
(Co0.95Li0.95Mg0.05O1.9) 496816-58-1, Iron **lithium** zirconium  
phosphate (Fe0.98LiZr0.02(PO4))  
RL: DEV (Device component use); USES (Uses)  
(battery structures, self-organizing structures, and related  
methods)

IT 76-05-1, Trifluoroacetic acid, uses 104-15-4, Toluene sulfonic acid,  
uses 7647-01-0, Hydrochloric acid, uses 57534-41-5, Zonyl FSN  
RL: MOA (Modifier or additive use); USES (Uses)  
(battery structures, self-organizing structures, and related  
methods)

IT 9002-88-4, Polyethylene 11099-11-9, Vanadium oxide 25038-59-9, Mylar,  
uses  
RL: TEM (Technical or engineered material use); USES (Uses)  
(battery structures, self-organizing structures, and related  
methods)

IT 99742-70-8, Poly(o-methoxyaniline) 104934-51-2, Poly(3-octylthiophene)  
RL: TEM (Technical or engineered material use); USES (Uses)  
(coating; battery structures, self-organizing structures, and  
related methods)

IT 7440-50-8, Copper, uses  
RL: DEV (Device component use); USES (Uses)  
(current collector; battery structures, self-organizing  
structures, and related methods)

IT 7791-03-9, **Lithium** perchlorate 33454-82-9,  
**Lithium** triflate  
RL: MOA (Modifier or additive use); USES (Uses)  
(electrolyte, cog. polyethylene oxide; battery  
structures, self-organizing structures, and related methods)

IT 1303-86-2, Boron oxide b2o3, uses 1304-76-3, Bismuth oxide bi2o3, uses  
1314-56-3, Phosphorus pentoxide, uses 1317-36-8, Lead oxide pbo, uses  
7447-41-8, **Lithium** chloride, uses 7631-86-9, Silica, uses  
7789-24-4, **Lithium** fluoride, uses 10377-51-2, **Lithium**  
iodide 12057-24-8, Lithia, uses  
RL: DEV (Device component use); USES (Uses)  
(glass; battery structures, self-organizing structures, and  
related methods)

IT 7439-93-2D, **Lithium**, polyethylene oxide complexes 25322-68-3D,  
Peo, **lithium** complexes  
RL: MOA (Modifier or additive use); USES (Uses)  
(perchlorate- or triflate-containing; battery structures,  
self-organizing structures, and related methods)

L23 ANSWER 8 OF 35 CAPLUS COPYRIGHT 2004 ACS on STN

ACCESSION NUMBER: 2002:946737 CAPLUS  
 DOCUMENT NUMBER: 138:14325  
 TITLE: Solid **composite polymer electrolyte** for secondary **battery**  
 INVENTOR(S): Chen-Yang, Yui-Whei; Chen, Hung-Chang; Lin, Fu-Luo  
 PATENT ASSIGNEE(S): Chung Yuan Christian University, Taiwan  
 SOURCE: U.S. Pat. Appl. Publ., 5 pp.  
 CODEN: USXXCO  
 DOCUMENT TYPE: Patent  
 LANGUAGE: English  
 FAMILY ACC. NUM. COUNT: 1  
 PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
US 2002185627	A1	20021212	US 2001-865478	20010529
PRIORITY APPLN. INFO.:			US 2001-865478	20010529

AB A solid **composite polymer electrolyte** contains (I) a general amorphous branched **polymer** having recurrent units, each of which includes a backbone chain and at least a side chain linked to the backbone chain and containing at least one coordination potential atom, (II) an amphoteric metal salt dispersed in the branched **polymer** and forming Lewis acid-base interactions with the side chains, and (III) an amphoteric Lewis acid-base ceramic filler dispersed in the branched **polymer** and forming Lewis acid-base interactions with the side chains and the metal salt. Thus, a **polymer electrolyte** was prepared by mixing poly[bis(methoxyethoxyethoxy)phosphazene] (prepared by reacting poly(dichlorophosphazene) with 2-(2-methoxyethoxyethanol) in the presence of sodium hydride in THF) with **lithium perchlorate** and  $\alpha$ -aluminum oxide.

IT 1344-28-1,  $\alpha$ -Aluminum oxide, uses  
 RL: MOA (Modifier or additive use); USES (Uses)  
 (Lewis acid-base ceramic filler; preparation of solid **composite polymer electrolyte** for secondary **battery**)

RN 1344-28-1 CAPLUS

CN Aluminum oxide (Al<sub>2</sub>O<sub>3</sub>) (8CI, 9CI) (CA INDEX NAME)

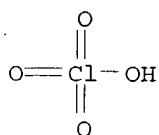
\*\*\* STRUCTURE DIAGRAM IS NOT AVAILABLE \*\*\*

IT 7791-03-9, **Lithium perchlorate**  
 RL: MOA (Modifier or additive use); USES (Uses)  
 (amphoteric metal salt; preparation of solid **composite polymer electrolyte** for secondary **battery**)

RN 7791-03-9 CAPLUS

CN Perchloric acid, lithium salt (8CI, 9CI) (CA INDEX NAME)





● Li

IT 25014-41-9, PAN  
 RL: POF (Polymer in formulation); PRP (Properties); TEM (Technical or engineered material use); USES (Uses)  
 (preparation of solid composite polymer electrolyte for secondary battery)  
 RN 25014-41-9 CAPLUS  
 CN 2-Propenenitrile, homopolymer (9CI) (CA INDEX NAME)  
 CM 1  
 CRN 107-13-1  
 CMF C3 H3 N



IC ICM H01G002-00  
 ICS H01M006-18  
 NCL 252062200; 429306000; 429323000  
 CC 37-3 (Plastics Manufacture and Processing)  
 Section cross-reference(s): 76  
 ST solid composite polymer electrolyte  
 secondary battery  
 IT Ceramics  
 (Lewis acid-base filler; preparation of solid composite polymer electrolyte for secondary battery)  
 IT Polymer electrolytes  
 (preparation of solid composite polymer electrolyte for secondary battery)  
 IT Polyphosphazenes  
 RL: IMF (Industrial manufacture); POF (Polymer in formulation); PRP (Properties); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)  
 (preparation of solid composite polymer electrolyte for secondary battery)  
 IT 1344-28-1,  $\alpha$ -Aluminum oxide, uses  
 RL: MOA (Modifier or additive use); USES (Uses)  
 (Lewis acid-base ceramic filler; preparation of solid composite polymer electrolyte for secondary battery)  
 IT 7791-03-9, Lithium perchlorate

RL: MOA (Modifier or additive use); USES (Uses)  
(amphoteric metal salt; preparation of solid **composite polymer electrolyte** for secondary battery)

IT 111-77-3DP, 2-(2-Methoxyethoxyethanol), reaction products with poly(dichlorophosphazene) 26085-02-9DP, Poly(dichlorophosphazene), reaction products with 2-(2-methoxyethoxyethanol)

RL: IMF (Industrial manufacture); POF (Polymer in formulation); PRP (Properties); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)

(preparation of solid **composite polymer electrolyte** for secondary battery)

IT 25014-41-9, PAN

RL: POF (Polymer in formulation); PRP (Properties); TEM (Technical or engineered material use); USES (Uses)

(preparation of solid **composite polymer electrolyte** for secondary battery)

L23 ANSWER 9 OF 35 CAPLUS COPYRIGHT 2004 ACS on STN

ACCESSION NUMBER: 2002:696297 CAPLUS

DOCUMENT NUMBER: 137:204015

TITLE: **Electrochemical** device using multicomponent **composite** membrane film

INVENTOR(S): Lee, Seung-Jin; Lee, Hyang-Mok; Ahn, Soon-Ho; Cho, Jin-Yeon; Yong, Hyun-Hang; Lee, Hyung-Keun; Lee, Sang-Young; Song, Heon-Sik; Ahn, Byeong-In; Park, Soon-Yong; Kyung, You-jin

PATENT ASSIGNEE(S): LG Chem, Ltd., S. Korea; et al.

SOURCE: PCT Int. Appl., 56 pp.

CODEN: PIXXD2

DOCUMENT TYPE: Patent

LANGUAGE: English

FAMILY ACC. NUM. COUNT: 1

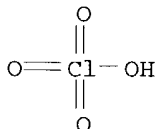
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 2002071509	A1	20020912	WO 2002-KR377	20020305
W: CN, JP, US				
RW: AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR				
EP 1285468	A1	20030226	EP 2002-705524	20020305
R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, FI, CY, TR				
US 2003104273	A1	20030605	US 2002-258170	20021022
PRIORITY APPLN. INFO.: KR 2001-11192 A 20010305				
WO 2002-KR377 W 20020305				

AB The present invention provides an **electrochem.** element, wherein a multi-component **composite** film comprising (a) **polymer** support layer film and (b) a porous gellable **polymer** layer which is formed on either or both sides of the support layer film of (a), wherein the support layer film of (a) and the gellable **polymer** layer of (b) are unified with each other without an interface between

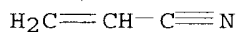
them.

IT 7791-03-9, Lithium perchlorate 25014-41-9,  
Polyacrylonitrile  
RL: DEV (Device component use); USES (Uses)  
(electrochem. device using multicomponent composite  
membrane film)  
RN 7791-03-9 CAPLUS  
CN Perchloric acid, lithium salt (8CI, 9CI) (CA INDEX NAME)



● Li

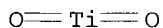
RN 25014-41-9 CAPLUS  
CN 2-Propenenitrile, homopolymer (9CI) (CA INDEX NAME)  
  
CM 1  
  
CRN 107-13-1  
CMF C3 H3 N



IT 1344-28-1, Alumina, uses 13463-67-7, Titania, uses  
RL: MOA (Modifier or additive use); USES (Uses)  
(electrochem. device using multicomponent composite  
membrane film)  
RN 1344-28-1 CAPLUS  
CN Aluminum oxide (Al<sub>2</sub>O<sub>3</sub>) (8CI, 9CI) (CA INDEX NAME)

\*\*\* STRUCTURE DIAGRAM IS NOT AVAILABLE \*\*\*

RN 13463-67-7 CAPLUS  
CN Titanium oxide (TiO<sub>2</sub>) (8CI, 9CI) (CA INDEX NAME)



IC ICM H01M002-14  
CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
Section cross-reference(s): 38  
ST battery multicomponent composite membrane film  
IT Polyesters, uses

RL: DEV (Device component use); USES (Uses)  
 (acrylates; **electrochem.** device using multicomponent  
**composite** membrane film)

IT Secondary **batteries**  
 Secondary **battery** separators  
 (**electrochem.** device using multicomponent **composite**  
 membrane film)

IT Fluoropolymers, uses  
 Polyamides, uses  
 Polycarbonates, uses  
 Polyesters, uses  
 Polyoxyalkylenes, uses  
 Polyoxyphenylenes  
 Polysiloxanes, uses  
 Polysulfones, uses  
 Polyurethanes, uses

RL: DEV (Device component use); USES (Uses)  
 (**electrochem.** device using multicomponent **composite**  
 membrane film)

IT Polyolefins  
 RL: DEV (Device component use); USES (Uses)  
 (ionomers; **electrochem.** device using multicomponent  
**composite** membrane film)

IT Ionomers  
 RL: DEV (Device component use); USES (Uses)  
 (polyolefins; **electrochem.** device using multicomponent  
**composite** membrane film)

IT **Polymers**, uses  
 RL: DEV (Device component use); USES (Uses)  
 (porous gellable; **electrochem.** device using multicomponent  
**composite** membrane film)

IT 556-65-0, **Lithium** thiocyanate 7791-03-9,  
**Lithium** perchlorate 9002-85-1, Polyvinylidene chloride  
 9002-88-4, Polyethylene 9003-01-4, Polyacrylic acid 9003-05-8,  
 Polyacrylamide 9003-07-0, Polypropylene 9003-20-7, Polyvinyl acetate  
 9003-39-8, Polyvinylpyrrolidone 9003-53-6, Polystyrene 9010-75-7,  
 Chlorotrifluoroethylene-vinylidene fluoride copolymer 9010-79-1,  
 Ethylene-propylene copolymer 9011-14-7, Pmma 9011-17-0,  
 Hexafluoropropylene-vinylidene fluoride copolymer 9016-80-2, Polymethyl  
 pentene 9019-29-8, Ethylene-butylene copolymer 9041-80-9,  
 Polyphenylene oxide 14283-07-9, **Lithium** tetrafluoroborate  
 24937-79-9, Polyvinylidene fluoride 25014-41-9,  
 Polyacrylonitrile 25190-06-1, Polybutylene oxide 25322-68-3, Peo  
 25322-69-4, Polypropylene oxide 25568-84-7D, Polycyclopentadiene,  
 hydrogenated 29935-35-1, **Lithium** hexafluoroarsenate  
 33454-82-9, **Lithium** triflate 39410-01-0, Butylene-styrene  
 copolymer 57271-36-0, Butylene-ethylene-styrene copolymer 57619-91-7,  
 Polytetraethylene glycol diacrylate 70800-37-2, Ethylene-octene  
 copolymer 88117-78-6, Ethylene-hexene copolymer 90076-65-6

RL: DEV (Device component use); USES (Uses)  
 (**electrochem.** device using multicomponent **composite**  
 membrane film)

IT 1303-86-2, Boron oxide b2o3, uses 1309-48-4, Magnesia, uses  
1344-28-1, Alumina, uses 7631-86-9, Silica, uses  
13463-67-7, Titania, uses  
RL: MOA (Modifier or additive use); USES (Uses)  
(electrochem. device using multicomponent composite  
membrane film)

IT 60-29-7, Diethyl ether, uses 64-17-5, Ethanol, uses 64-19-7, Acetic  
acid, uses 67-64-1, Acetone, uses 67-68-5, DmsO, uses 68-12-2, Dmf,  
uses 71-23-8, n-Propanol, uses 71-36-3, n-Butanol, uses 71-43-2,  
Benzene, uses 108-88-3, Toluene, uses 108-93-0, Cyclohexanol, uses  
109-99-9, Thf, uses 110-54-3, n-Hexane, uses 110-82-7, Cyclohexane,  
uses 123-91-1, Dioxane, uses 127-19-5, Dimethyl acetamide 141-78-6,  
Ethyl acetate, uses 872-50-4, 1-Methyl-2-pyrrolidone, uses 1330-20-7,  
Xylene, uses 7732-18-5, Water, uses  
RL: TEM (Technical or engineered material use); USES (Uses)  
(electrochem. device using multicomponent composite  
membrane film)

REFERENCE COUNT: 4 THERE ARE 4 CITED REFERENCES AVAILABLE FOR THIS  
RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L23 ANSWER 10 OF 35 CAPLUS COPYRIGHT 2004 ACS on STN

ACCESSION NUMBER: 2002:668076 CAPLUS

DOCUMENT NUMBER: 138:41901

TITLE: Polyacrylonitrile **electrolytes** 1. A novel  
high-conductivity **composite polymer**  
**electrolyte** based on PAN, LiClO<sub>4</sub> and  
 $\alpha$ -Al<sub>2</sub>O<sub>3</sub>

AUTHOR(S): Chen-Yang, Y. W.; Chen, H. C.; Lin, F. J.; Chen, C. C.  
CORPORATE SOURCE: Department of Chemistry and Center for Nanotechnology  
at CYCU, Chung Yuan Christian University, Taichung,  
32023, Taiwan

SOURCE: Solid State Ionics (2002), 150(3,4), 327-335  
CODEN: SSIOD3; ISSN: 0167-2738

PUBLISHER: Elsevier Science B.V.

DOCUMENT TYPE: Journal

LANGUAGE: English

AB In this work, a series of novel solid-type  $\alpha$ -Al<sub>2</sub>O<sub>3</sub>-containing  
polyacrylonitrile (PAN)-based **composite polymer**  
**electrolytes** (CPE) with high conductivity and high mech. property at room  
temperature has been prepared The effect of the addition of  $\alpha$ -Al<sub>2</sub>O<sub>3</sub> on the  
properties of the PAN-based **composite polymer**  
**electrolyte** has been analyzed. The best conductivities obtained  
at room temperature is  $5.7 \times 10^{-4}$  S cm<sup>-1</sup> from the CPE with 7.5 weight%  
 $\alpha$ -Al<sub>2</sub>O<sub>3</sub> and 0.6 LiClO<sub>4</sub> per PAN repeat unit. The stress-strain test  
result indicates that the membranes prepared possess high yield stress (73  
kg cm<sup>-2</sup>) suitable for serving as separators in the solid-state  
**lithium** and **lithium** ion **batteries** and high  
yield elongation (225%) pliable to form good interface with electrodes.  
Also discussed are the effects of the addition of the ceramics on the  
interactions in the system and the possible conduction mechanism.

IT 1344-28-1, Alumina, processes 7791-03-9, **Lithium**  
perchlorate 25014-41-9, Polyacrylonitrile

RL: CPS (Chemical process); PEP (Physical, engineering or chemical process); PROC (Process)

(high-conductivity **composite polymer electrolyte**  
based on polyacrylonitrile, LiClO<sub>4</sub> and α-Al<sub>2</sub>O<sub>3</sub>)

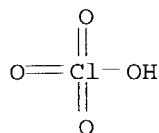
RN 1344-28-1 CAPLUS

CN Aluminum oxide (Al<sub>2</sub>O<sub>3</sub>) (8CI, 9CI) (CA INDEX NAME)

\*\*\* STRUCTURE DIAGRAM IS NOT AVAILABLE \*\*\*

RN 7791-03-9 CAPLUS

CN Perchloric acid, lithium salt (8CI, 9CI) (CA INDEX NAME)



● Li

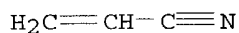
RN 25014-41-9 CAPLUS

CN 2-Propenenitrile, homopolymer (9CI) (CA INDEX NAME)

CM 1

CRN 107-13-1

CMF C3 H3 N



CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

ST **battery electrolyte** alumina polyacrylonitrile  
lithium perchlorate

IT **Battery electrolytes**

Fuel cell separators

(high-conductivity **composite polymer electrolyte**  
based on polyacrylonitrile, LiClO<sub>4</sub> and α-Al<sub>2</sub>O<sub>3</sub>)

IT 1344-28-1, Alumina, processes 7791-03-9, **Lithium**  
perchlorate 25014-41-9, Polyacrylonitrile

RL: CPS (Chemical process); PEP (Physical, engineering or chemical process); PROC (Process)

(high-conductivity **composite polymer electrolyte**  
based on polyacrylonitrile, LiClO<sub>4</sub> and α-Al<sub>2</sub>O<sub>3</sub>)

REFERENCE COUNT: 22 THERE ARE 22 CITED REFERENCES AVAILABLE FOR THIS  
RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L23 ANSWER 11 OF 35 CAPLUS COPYRIGHT 2004 ACS on STN

ACCESSION NUMBER: 2002:595200 CAPLUS

DOCUMENT NUMBER: 137:143066  
 TITLE: A multi-layered, UV-cured **polymer electrolyte** for lithium secondary **battery**  
 INVENTOR(S): Yun, Kyung-Suk; Cho, Byung-Won; Cho, Won-Il; Kim, Hyung-Sun; Kim, Un-Sek; Rhee, Hee-Woo; Kim, Yong-Tae  
 PATENT ASSIGNEE(S): Korea Institute of Science and Technology, S. Korea  
 SOURCE: PCT Int. Appl., 40 pp.  
 CODEN: PIXXD2  
 DOCUMENT TYPE: Patent  
 LANGUAGE: English  
 FAMILY ACC. NUM. COUNT: 1  
 PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 2002061874	A1	<del>20020808</del>	WO 2001-KR133	20010131
W: JP, KR, US				
US 2003180623	A1	20030925	US 2003-275383	<u>20030522</u>

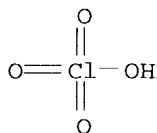
PRIORITY APPLN. INFO.: WO 2001-KR133 W 20010131

AB The present invention relates to a multi-layered, UV-cured **polymer electrolyte** and lithium secondary **battery** comprising the same, wherein the **polymer electrolyte** comprises: (A) a separator layer formed of **polymer electrolyte**, PP, PE, PVdF or non-woven fabric, wherein the separator layer having two surfaces; (B) at least one gelled **polymer electrolyte** layer located on at least one surface of the separator layer comprising: (a) **polymer** obtained by curing ethyleneglycoldi(meth)acrylate oligomer of the formula by UV irradiation:  $\text{CH}_2=\text{CR}_1\text{COO}(\text{CH}_2\text{CH}_2\text{O})_n\text{COCR}_2=\text{CH}_2$  wherein, R1 and R2 are independently hydrogen or Me group, and n is a integer of 3-20; and (b) at least one **polymer** selected from the group consisting of PVdF-based **polymer**, PAN-based **polymer**, PMMA-based **polymer** and PVC-based **polymer**; and (C) organic **electrolyte** solution in which lithium salt is dissolved in a solvent.

IT 7791-03-9, Lithium perchlorate 9003-00-3, Acrylonitrile-vinyl chloride copolymer 24968-79-4, Acrylonitrile-methylacrylate copolymer 25014-41-9, Polyacrylonitrile  
 RL: DEV (Device component use); USES (Uses)  
 (multilayered, UV-cured **polymer electrolyte** for lithium secondary **battery**)

RN 7791-03-9 CAPLUS

CN Perchloric acid, lithium salt (8CI, 9CI) (CA INDEX NAME)

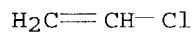


● Li

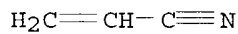
RN 9003-00-3 CAPLUS  
CN 2-Propenenitrile, polymer with chloroethene (9CI) (CA INDEX NAME)  
  
CM 1  
  
CRN 107-13-1  
CMF C3 H3 N



CM 2  
  
CRN 75-01-4  
CMF C2 H3 Cl

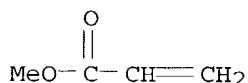


RN 24968-79-4 CAPLUS  
CN 2-Propenoic acid, methyl ester, polymer with 2-propenenitrile (9CI) (CA INDEX NAME)  
  
CM 1  
  
CRN 107-13-1  
CMF C3 H3 N



CM 2  
  
CRN 96-33-3  
CMF C4 H6 O2





RN 25014-41-9 CAPLUS  
CN 2-Propenenitrile, homopolymer (9CI) (CA INDEX NAME)

CM 1

CRN 107-13-1

CMF C3 H3 N



IT 1344-28-1, Alumina, uses 13463-67-7, Titania, uses  
RL: MOA (Modifier or additive use); USES (Uses)  
(porous filler; multilayered, UV-cured **polymer electrolyte** for lithium secondary battery)

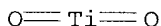
RN 1344-28-1 CAPLUS

CN Aluminum oxide (Al2O3) (8CI, 9CI) (CA INDEX NAME)

\*\*\* STRUCTURE DIAGRAM IS NOT AVAILABLE \*\*\*

RN 13463-67-7 CAPLUS

CN Titanium oxide (TiO2) (8CI, 9CI) (CA INDEX NAME)



IC ICM H01M010-40

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
Section cross-reference(s): 38

ST **lithium secondary battery UV cured polymer electrolyte**

IT Secondary batteries

(lithium; multilayered, UV-cured **polymer electrolyte** for lithium secondary battery)

IT **Battery electrolytes**

**Polymer electrolytes**

(multilayered, UV-cured **polymer electrolyte** for lithium secondary battery)

IT Coke

Fluoropolymers, uses

**Polymer blends**

RL: DEV (Device component use); USES (Uses)

(multilayered, UV-cured **polymer electrolyte** for lithium secondary battery)

IT Crosslinking

(photochem.; multilayered, UV-cured **polymer electrolyte for lithium secondary battery**)

IT Fluoropolymers, uses  
**Polymers, uses**  
 RL: MOA (Modifier or additive use); USES (Uses)  
 (porous filler; multilayered, UV-cured **polymer electrolyte for lithium secondary battery**)

IT **Lithium** alloy, base  
 RL: DEV (Device component use); USES (Uses)  
 (multilayered, UV-cured **polymer electrolyte for lithium secondary battery**)

IT 102-71-6, Triethanolamine, uses 102-82-9, Tributylamine 103-83-3, n-Benzyl dimethylamine 121-44-8, Triethylamine, uses  
 RL: MOA (Modifier or additive use); USES (Uses)  
 (UV curing accelerator; multilayered, UV-cured **polymer electrolyte for lithium secondary battery**)

IT 84-51-5, 2-Ethyl Anthraquinone 84-65-1, Anthraquinone 93-97-0, Benzoyl benzoate 119-61-9, Benzophenone, uses 120-51-4, Benzyl benzoate 131-09-9, 2-Chloro Anthraquinone 492-22-8, Thioxanthone 574-09-4, Ethyl benzoin ether 947-19-3, 1-Hydroxycyclohexyl phenyl ketone 2648-61-5 3524-62-7 5293-97-0, 2,2'-Dichlorobenzophenone 6175-45-7, 2,2-Diethoxyacetophenone 6652-28-4, Isopropyl benzoin ether 6652-29-5, Benzoin phenyl ether 7473-98-5, 2-Hydroxy-2-methyl-1-phenylpropane-1-one 7624-24-0 7727-54-0, Ammonium persulfate 24650-42-8, 2,2-Dimethoxy-2-phenylacetophenone 72896-34-5, Chlorothioxanthone 75081-21-9, Isopropyl thioxanthone  
 RL: MOA (Modifier or additive use); USES (Uses)  
 (UV curing initiator; multilayered, UV-cured **polymer electrolyte for lithium secondary battery**)

IT 7440-44-0, Carbon, uses  
 RL: DEV (Device component use); USES (Uses)  
 (hard; multilayered, UV-cured **polymer electrolyte for lithium secondary battery**)

IT 68-12-2, Dmf, uses 75-05-8, Acetonitrile, uses 79-20-9, Methyl acetate 96-48-0,  $\gamma$ -Butyrolactone 96-49-1, Ethylene carbonate 105-37-3, Ethyl propionate 105-58-8, Diethyl carbonate 108-32-7, Propylene carbonate 109-99-9, Thf, uses 110-71-4, 1,2-Dimethoxyethane 127-19-5, Dimethyl acetamide 141-78-6, Ethyl acetate, uses 554-12-1, Methyl propionate 616-38-6, Dimethyl carbonate 623-53-0, Ethyl methyl carbonate 1314-62-1, Vanadium pentoxide, uses 1332-29-2, Tin oxide 4437-85-8, Butylene carbonate 7439-93-2, **Lithium**, uses 7782-42-5, Graphite, uses **7791-03-9, Lithium perchlorate** 9002-86-2, Polyvinyl chloride 9002-88-4, Polyethylene **9003-00-3, Acrylonitrile-vinyl chloride copolymer** 9003-07-0, Polypropylene 9010-88-2, Ethyl acrylate-methyl methacrylate copolymer 9011-14-7, Pmma 9011-17-0, Kynar 2801 9056-77-3, Poly(ethylene glycol methacrylate) 12031-65-1, **Lithium nickel oxide** linio2 12037-42-2, Vanadium oxide v6o13 12190-79-3, Cobalt **lithium oxide** colio2 14283-07-9, **Lithium tetrafluoroborate** 21324-40-3, **Lithium hexafluorophosphate** 24937-79-9, PvdF **24968-79-4, Acrylonitrile-methylacrylate copolymer** **25014-41-9, Polyacrylonitrile** 25086-15-1, Methacrylic

acid-methyl methacrylate copolymer 29935-35-1, **Lithium**  
hexafluoroarsenate 33454-82-9, **Lithium** triflate 90076-65-6  
162004-08-2, Cobalt **lithium** nickel oxide colinio2  
RL: DEV (Device component use); USES (Uses)

(multilayered, UV-cured **polymer electrolyte** for  
**lithium secondary battery**)

IT 554-13-2 1304-28-5, Baria, uses 1309-48-4, Magnesia, uses 1310-65-2,  
**Lithium** hydroxide (Li(OH)) 1313-59-3, Sodium oxide, uses  
1344-28-1, Alumina, uses 7631-86-9, Silica, uses 7789-24-4,  
**Lithium** fluoride, uses 9002-84-0, Ptfе 12003-67-7, Aluminum  
**lithium** oxide alio2 12047-27-7, Barium titanium oxide batio3,  
uses 12057-24-8, Lithia, uses 13463-67-7, Titania, uses  
26134-62-3, **Lithium** nitride (Li3N)

RL: MOA (Modifier or additive use); USES (Uses)  
(porous filler; multilayered, UV-cured **polymer**  
**electrolyte** for **lithium secondary battery**)

REFERENCE COUNT: 7 THERE ARE 7 CITED REFERENCES AVAILABLE FOR THIS  
RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L23 ANSWER 12 OF 35 CAPLUS COPYRIGHT 2004 ACS on STN

ACCESSION NUMBER: 2002:595199 CAPLUS

DOCUMENT NUMBER: 137:143065

TITLE: Fabrication of **lithium secondary**  
**battery** with a UV-cured multi-component  
**polymer blend electrolyte**

INVENTOR(S): Cho, Byung-Won; Cho, Won-Il; Kim, Hyung-Sun; Kim,  
Un-Sek; Rhee, Hee-Woo; Kim, Yong-Tae; Song, Min-Kyu  
PATENT ASSIGNEE(S): Korea Institute of Science and Technology, S. Korea  
SOURCE: PCT Int. Appl., 35 pp.

CODEN: PIXXD2

DOCUMENT TYPE: Patent

LANGUAGE: English

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 2002061873	A1	20020808	WO 2001-KR130	20010131
W: JP, KR, US				

PRIORITY APPLN. INFO.: WO 2001-KR130 20010131

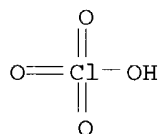
AB The present invention relates to a UV-cured multi-component  
**polymer blend electrolyte, lithium secondary**  
**battery** and their fabrication method, wherein the UV-cured  
multi-component **polymer blend electrolyte**, comprises:  
(A) function-I **polymer** obtained by curing ethylene glycol  
dimethacrylate oligomer of formula by UV irradiation,  
CH<sub>2</sub>=CR<sub>1</sub>COO(CH<sub>2</sub>CH<sub>2</sub>O)<sub>n</sub>COCR<sub>2</sub>=CH<sub>2</sub> wherein, R<sub>1</sub> and R<sub>2</sub> are independently a  
hydrogen or Me group, and n is an integer of 3-20; (B) function-II  
**polymer** selected from the group consisting of PAN-based  
**polymer**, PMMA-based **polymer** and mixts. thereof; (C)  
function-III **polymer** selected from the group consisting of  
PVdF-based **polymer**, PVC-based **polymer** and mixts.

thereof; and (D) organic **electrolyte** solution in which **lithium** salt is dissolved in a solvent.

IT 7791-03-9, **Lithium** perchlorate 9003-00-3,  
 Acrylonitrile-vinyl chloride copolymer 24968-79-4,  
 Acrylonitrile-methylacrylate copolymer 25014-41-9,  
 Polyacrylonitrile  
 RL: DEV (Device component use); USES (Uses)  
 (fabrication of **lithium** secondary **battery** with  
 UV-cured multi-component **polymer** blend **electrolyte**)

RN 7791-03-9 CAPLUS

CN Perchloric acid, lithium salt (8CI, 9CI) (CA INDEX NAME)



● Li

RN 9003-00-3 CAPLUS

CN 2-Propenenitrile, polymer with chloroethene (9CI) (CA INDEX NAME)

CM 1

CRN 107-13-1

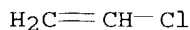
CMF C3 H3 N



CM 2

CRN 75-01-4

CMF C2 H3 Cl



RN 24968-79-4 CAPLUS

CN 2-Propenoic acid, methyl ester, polymer with 2-propenenitrile (9CI) (CA INDEX NAME)

CM 1

CRN 107-13-1

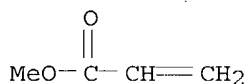
CMF C3 H3 N



CM 2

CRN 96-33-3

CMF C4 H6 O2



RN 25014-41-9 CAPLUS

CN 2-Propenenitrile, homopolymer (9CI) (CA INDEX NAME)

CM 1

CRN 107-13-1

CMF C3 H3 N



IT 1344-28-1, Alumina, uses 13463-67-7, Titania, uses  
RL: MOA (Modifier or additive use); USES (Uses)  
(porous filler; fabrication of **lithium** secondary  
**battery** with UV-cured multi-component **polymer** blend  
**electrolyte**)

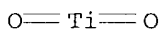
RN 1344-28-1 CAPLUS

CN Aluminum oxide (Al2O3) (8CI, 9CI) (CA INDEX NAME)

\*\*\* STRUCTURE DIAGRAM IS NOT AVAILABLE \*\*\*

RN 13463-67-7 CAPLUS

CN Titanium oxide (TiO2) (8CI, 9CI) (CA INDEX NAME)



IC ICM H01M010-40

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
Section cross-reference(s): 38

ST **lithium** secondary **battery** fabrication UV cured  
**polymer** blend **electrolyte**

IT **Battery electrolytes**

**Polymer electrolytes**

(fabrication of **lithium** secondary battery with  
UV-cured multi-component **polymer** blend **electrolyte**)

IT Coke

**Polymer** blends

RL: DEV (Device component use); USES (Uses)

(fabrication of **lithium** secondary battery with  
UV-cured multi-component **polymer** blend **electrolyte**)

IT **Polymers**, uses

RL: MOA (Modifier or additive use); USES (Uses)

(fillers; fabrication of **lithium** secondary battery  
with UV-cured multi-component **polymer** blend  
**electrolyte**)

IT Secondary **batteries**

(**lithium**; fabrication of **lithium** secondary  
**battery** with UV-cured multi-component **polymer** blend  
**electrolyte**)

IT Crosslinking

(photochem.; fabrication of **lithium** secondary battery  
with UV-cured multi-component **polymer** blend  
**electrolyte**)

IT Fluoropolymers, uses

RL: MOA (Modifier or additive use); USES (Uses)

(porous filler; fabrication of **lithium** secondary  
**battery** with UV-cured multi-component **polymer** blend  
**electrolyte**)

IT **Lithium** alloy, base

RL: DEV (Device component use); USES (Uses)

(fabrication of **lithium** secondary battery with  
UV-cured multi-component **polymer** blend **electrolyte**)

IT 84-51-5, 2-Ethylanthraquinone 84-65-1, Anthraquinone 93-97-0, Benzoyl  
benzoate 119-61-9, Benzophenone, uses 120-51-4, Benzyl benzoate  
131-09-9, 2-Chloroanthraquinone 492-22-8, Thioxanthone 574-09-4, Ethyl  
benzoin ether 947-19-3, 1-Hydroxycyclohexyl phenyl ketone 2648-61-5  
5293-97-0, 2,2'-Dichlorobenzophenone 6175-45-7, 2,2-Diethoxyacetophenone  
6652-29-5, Benzoin phenyl ether 7473-98-5, 2-Hydroxy-2-methyl-1-  
phenylpropane-1-one 7624-24-0 7727-54-0, Ammonium persulfate  
24650-42-8, 2,2-Dimethoxy-2-phenylacetophenone 72896-34-5,  
Chlorothioxanthone 75081-21-9, Isopropyl thioxanthone

RL: MOA (Modifier or additive use); USES (Uses)

(UV curing initiator; fabrication of **lithium** secondary  
**battery** with UV-cured multi-component **polymer** blend  
**electrolyte**)

IT 68-12-2, Dmf, uses 75-05-8, Acetonitrile, uses 79-20-9, Methyl acetate  
96-48-0,  $\gamma$ -Butyrolactone 96-49-1, Ethylene carbonate 105-37-3,  
Ethyl propionate 105-58-8, Diethyl carbonate 108-32-7, Propylene  
carbonate 109-99-9, Thf, uses 110-71-4, 1,2-Dimethoxyethane  
127-19-5, Dimethyl acetamide 141-78-6, Ethyl acetate, uses 554-12-1,  
Methyl propionate 616-38-6, Dimethyl carbonate 623-53-0, Ethyl methyl  
carbonate 1314-62-1, Vanadia, uses 1332-29-2, Tin oxide 4437-85-8,  
Butylene carbonate 7439-93-2, **Lithium**, uses 7782-42-5,  
Graphite, uses 7791-03-9, **Lithium** perchlorate

9002-86-2, Polyvinyl chloride 9003-00-3, Acrylonitrile-vinyl chloride copolymer 9010-88-2, Ethyl acrylate-methyl methacrylate copolymer 9011-14-7, Pmma 9011-17-0, Kynar 2801 12031-65-1, **Lithium** nickel oxide linio2 12037-42-2, Vanadium oxidev6o13 12057-17-9, **Lithium** manganese oxide limn2o4 12190-79-3, Cobalt **lithium** oxide colio2 14283-07-9, **Lithium** tetrafluoroborate 21324-40-3, **Lithium** hexafluorophosphate 24968-79-4, Acrylonitrile-methylacrylate copolymer 25014-41-9, Polyacrylonitrile 25086-15-1, Methacrylic acid-methyl methacrylate copolymer 26570-48-9, Polyethylene glycol diacrylate 29935-35-1, **Lithium** hexafluoroarsenate 33454-82-9, **Lithium** triflate 90076-65-6 162004-08-2, Cobalt **lithium** nickel oxide colinio2

RL: DEV (Device component use); USES (Uses)  
(fabrication of **lithium** secondary **battery** with UV-cured multi-component **polymer** blend **electrolyte**)

IT 7440-44-0, Carbon, uses

RL: DEV (Device component use); USES (Uses)  
(hard; fabrication of **lithium** secondary **battery** with UV-cured multi-component **polymer** blend **electrolyte**)

IT 554-13-2 1304-28-5, Barium oxide (BaO), uses 1309-48-4, Magnesium oxide (MgO), uses 1310-65-2, **Lithium** hydroxide (Li(OH)) 1313-59-3, Sodium oxide (Na2O), uses 1344-28-1, Alumina, uses 7631-86-9, Silica, uses 7789-24-4, **Lithium** fluoride, uses 9002-84-0, Ptfе 12003-67-7, Aluminum **lithium** oxide allio2 12047-27-7, Barium titanium oxide batio3, uses 12057-24-8, Lithia, uses 13463-67-7, Titania, uses 26134-62-3, **Lithium** nitride (Li3N)

RL: MOA (Modifier or additive use); USES (Uses)  
(porous filler; fabrication of **lithium** secondary **battery** with UV-cured multi-component **polymer** blend **electrolyte**)

REFERENCE COUNT: 7 THERE ARE 7 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L23 ANSWER 13 OF 35 CAPLUS COPYRIGHT 2004 ACS on STN

ACCESSION NUMBER: 2002:585696 CAPLUS

DOCUMENT NUMBER: 137:111647

TITLE: Secondary Li ion **battery** using colloidal **polymer** as **electrolyte** and its preparing process

INVENTOR(S): Gu, Hui; Huang, Xuejie; Chen, Liqun

PATENT ASSIGNEE(S): Inst. of Physics, Chinese Academy of Sciences, Peop. Rep. China

SOURCE: Faming Zhuanli Shenqing Gongkai Shuomingshu, 33 pp.  
CODEN: CNXXEV

DOCUMENT TYPE: Patent

LANGUAGE: Chinese

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
CN 1315752	A	20011003	CN 2000-105541	20000330

PRIORITY APPLN. INFO.: CN 2000-105541 20000330

AB The **battery** consists of an anode with a carbonaceous material as active material, a cathode with LiCoO<sub>2</sub>, LiNiO<sub>2</sub>, or LiMn<sub>2</sub>O<sub>4</sub> as active material, colloidal **polymer electrolyte**, **polymer** separator, etc. The colloidal **polymer electrolyte** is prepared from: (1) monomers such as Me methacrylate, Bu methacrylate, isooctyl methacrylate, allyl methacrylate, Me acrylate, Et acrylate, Bu acrylate, polyethylene glycol alkyl ether monoacrylate, polyethylene glycol diacrylate, polyethylene glycol alkyl ether monomethacrylate, or polyethylene glycol dimethacrylate, (2) solvent for the **electrolyte** such as ethylene carbonate, propylene carbonate, di-Me carbonate, di-Et carbonate, ethylmethyl carbonate, or dimethoxyethane, (3) soluble Li salt such as LiN(CF<sub>3</sub>SO<sub>2</sub>)<sub>3</sub>, LiClO<sub>4</sub>, LiBF<sub>4</sub>, LiPF<sub>6</sub>, LiCF<sub>3</sub>SO<sub>3</sub>, LiNH(CF<sub>3</sub>SO<sub>2</sub>)<sub>2</sub>, or LiAsF<sub>6</sub>, (4) initiators such as AIBN, 2,2'-azobis(isoheptyronitrile), 2-tert-Bu oxide, dicumyl peroxide, benzoyl superoxide, dilauroyl peroxide, isopropylbenzene hydroperoxide, diisopropyl pyrocarbonate, dicyclohexyl pyrocarbonate, cyclohexane carboxylate, organometallic compds., triethylboron, combination of benzoyl superoxide and N,N-di-Me aniline, benzoin iso-Bu ether, benzoin iso-Pr ether, benzoin Me ether, benzoin Et ether, benzophenone, acetophenone, diethoxyacetophenone, etc., (5) nanometer SiO<sub>2</sub> or Al<sub>2</sub>O<sub>3</sub>, amorphous film separator of **polymers** such as polypropylene, polyethylene, poly(vinylidene fluoride), PAN, or fiber- or powder- reinforced polyethylene glycol.

IT 1344-28-1, Alumina, uses 7791-03-9, **Lithium** perchlorate 25014-41-9, PAN (**polymer**)  
 RL: CPS (Chemical process); DEV (Device component use); PEP (Physical, engineering or chemical process); PROC (Process); USES (Uses)  
 (secondary Li ion **battery** using colloidal **polymer** as **electrolyte** and preparing process)

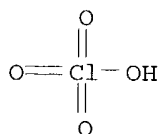
RN 1344-28-1 CAPLUS

CN Aluminum oxide (Al<sub>2</sub>O<sub>3</sub>) (8CI, 9CI) (CA INDEX NAME)

\*\*\* STRUCTURE DIAGRAM IS NOT AVAILABLE \*\*\*

RN 7791-03-9 CAPLUS

CN Perchloric acid, lithium salt (8CI, 9CI) (CA INDEX NAME)



● Li

RN 25014-41-9 CAPLUS



CN 2-Propenenitrile, homopolymer (9CI) (CA INDEX NAME)

CM 1

CRN 107-13-1

CMF C3 H3 N



IC ICM H01M010-40

ICS H01M010-38

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

ST **lithium ion battery colloidal polymer electrolyte**

IT Polyoxyalkylenes, uses

RL: CPS (Chemical process); DEV (Device component use); PEP (Physical, engineering or chemical process); RCT (Reactant); PROC (Process); RACT (Reactant or reagent); USES (Uses)

(alkyl ether mono(meth)acrylate; secondary Li ion **battery** using colloidal **polymer** as **electrolyte** and preparing process)

IT Secondary **batteries**

(**lithium**; secondary Li ion **battery** using colloidal **polymer** as **electrolyte** and preparing process)

IT **Battery** anodes

**Battery** cathodes

Colloids

**Polymer electrolytes**

Secondary **battery** separators

(secondary Li ion **battery** using colloidal **polymer** as **electrolyte** and preparing process)

IT Carbonaceous materials (technological products)

Fluoropolymers, uses

Polyoxyalkylenes, uses

RL: CPS (Chemical process); DEV (Device component use); PEP (Physical, engineering or chemical process); PROC (Process); USES (Uses)

(secondary Li ion **battery** using colloidal **polymer** as **electrolyte** and preparing process)

IT 78-67-1, AIBN 80-15-9, Isopropylbenzene hydroperoxide 80-43-3, Dicumyl peroxide 94-36-0, Benzoyl superoxide, uses 96-49-1, Ethylene carbonate 97-94-9, Triethylboron 98-86-2, Acetophenone, uses 105-58-8, Diethyl carbonate 105-74-8, Dilauroyl peroxide 108-32-7, Propylene carbonate 110-05-4, Bis(tert-Butyl) peroxide 110-71-4 119-61-9, Benzophenone, uses 121-69-7, N,N-Dimethyl aniline, uses 574-09-4, Benzoin ethyl ether 616-38-6, Dimethyl carbonate 623-53-0, Ethylmethyl carbonate 1344-28-1, Alumina, uses 3198-23-0, Cyclohexane carboxylate 3524-62-7, Benzoin methyl ether 6175-45-7, Diethoxyacetophenone 6652-28-4, Benzoin isopropyl ether 7631-86-9, Silica, uses 7791-03-9, **Lithium** perchlorate 9002-88-4, Polyethylene 9003-07-0, Polypropylene 9011-17-0, Vinylidene fluoride-

hexafluoropropene copolymer 12031-65-1, **Lithium** nickel oxide (LiNiO<sub>2</sub>) 12057-17-9, **Lithium** manganese oxide (LiMn<sub>2</sub>O<sub>4</sub>) 12190-79-3, Cobalt **lithium** oxide (LiCoO<sub>2</sub>) 14283-07-9, **Lithium** tetrafluoroborate (LiBF<sub>4</sub>) 15545-95-6 21324-40-3, **Lithium** hexafluorophosphate (LiPF<sub>6</sub>) 22499-12-3, Benzoin isobutyl ether 24425-00-1, Diisopropyl pyrocarbonate 24937-79-9, Poly(vinylidene fluoride) **25014-41-9**, PAN (**polymer**) 25322-68-3, Poly(ethylene glycol) 29935-35-1, **Lithium** hexafluoroarsenate (LiAsF<sub>6</sub>) 33454-82-9 61114-49-6, Dicyclohexyl pyrocarbonate 90076-65-6  
 RL: CPS (Chemical process); DEV (Device component use); PEP (Physical, engineering or chemical process); PROC (Process); USES (Uses)

(secondary Li ion **battery** using colloidal **polymer** as **electrolyte** and preparing process)

IT 80-62-6, Methyl methacrylate 96-05-9, Allyl methacrylate 96-33-3, Methyl acrylate 97-63-2, Ethyl methacrylate 97-86-9, IsoButyl methacrylate 97-88-1, Butyl methacrylate 140-88-5, Ethyl acrylate 141-32-2, Butyl acrylate 2210-28-8, Propyl methacrylate 25322-68-3D, Polyethylene glycol, alkyl ether mono(meth)acrylate 25721-76-0, Polyethylene glycol dimethacrylate 28158-16-9, Poly(ethylene glycol diacrylate) 28675-80-1, Isooctyl methacrylate  
 RL: CPS (Chemical process); DEV (Device component use); PEP (Physical, engineering or chemical process); RCT (Reactant); PROC (Process); RACT (Reactant or reagent); USES (Uses)

(secondary Li ion **battery** using colloidal **polymer** as **electrolyte** and preparing process)

*note*

L23 ANSWER 14 OF 35 CAPLUS COPYRIGHT 2004 ACS on STN

ACCESSION NUMBER: 2002:143078 CAPLUS

DOCUMENT NUMBER: 136:201311

TITLE: Multicomponent **composite** film and method for preparing the same

INVENTOR(S): Lee, Seung-Jin; Lee, Hyang-Mok; Ahn, Soon-Ho; Cho, Jin-Yeon; Yong, Hyun-Hang; Lee, Hyung-Keun; Lee, Sang-Young; Song, Heon-Sik; Park, Soon-Yong; Kyung, You-Jin; Ahn, Byeong-In

PATENT ASSIGNEE(S): LG Chemical Co., Ltd., S. Korea

SOURCE: PCT Int. Appl., 34 pp.

CODEN: PIXXD2

DOCUMENT TYPE: Patent

LANGUAGE: English

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 2002015299	A1	<u>20020221</u>	WO 2001-KR1374	20010811
W: CN, JP, US				
RW: AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR				
EP 1310005	A1	<u>20030514</u>	EP 2001-958588	20010811
R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT,				

IE, FI, CY, TR

JP 2004506542 T2 20040304 JP 2002-520328 20010811  
 US 2002187401 A1 ~~20021212~~ US 2002-110047 ~~20020405~~  
 PRIORITY APPLN. INFO.: KR 2000-46735 A 20000812  
 KR 2001-11191 A 20010305  
 WO 2001-KR1374 W 20010811

AB The present invention provides a multi-component **composite** film comprising (a) **polymer** support layer (e.g., polypropylene); and (b) porous gelable **polymer** layer (e.g., polyvinylidene fluoride) which is formed on one side or both sides of the support layer of (a), wherein the support film of (a) and the gelable **polymer** layer of (b) are unified without the interface, a method for preparing the same, and a **polymer electrolyte** system applied the same.

IT 1344-28-1, Alumina, uses 7791-03-9, **Lithium**

perchlorate LiClO<sub>4</sub> 13463-67-7, Titania, uses

RL: MOA (Modifier or additive use); USES (Uses)

(multicomponent **composite** film and method for preparing the same)

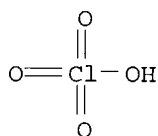
RN 1344-28-1 CAPLUS

CN Aluminum oxide (Al<sub>2</sub>O<sub>3</sub>) (8CI, 9CI) (CA INDEX NAME)

\*\*\* STRUCTURE DIAGRAM IS NOT AVAILABLE \*\*\*

RN 7791-03-9 CAPLUS

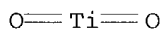
CN Perchloric acid, lithium salt (8CI, 9CI) (CA INDEX NAME)



● Li

RN 13463-67-7 CAPLUS

CN Titanium oxide (TiO<sub>2</sub>) (8CI, 9CI) (CA INDEX NAME)



IT 25014-41-9, Polyacrylonitrile

RL: TEM (Technical or engineered material use); USES (Uses)

(multicomponent **composite** film and method for preparing the same)

RN 25014-41-9 CAPLUS

CN 2-Propenenitrile, homopolymer (9CI) (CA INDEX NAME)

CM 1

CRN 107-13-1  
CMF C3 H3 N



- IC ICM H01M002-16  
CC 38-3 (Plastics Fabrication and Uses)  
Section cross-reference(s): 52  
ST multicomponent **composite polymer** film  
**electrolyte**  
IT Electric apparatus  
(**electrochem.**; multicomponent **composite** film and  
method for preparing the same)  
IT Styrene-butadiene rubber, uses  
RL: TEM (Technical or engineered material use); USES (Uses)  
(hydrogenated, block, triblock; multicomponent **composite** film  
and method for preparing the same)  
IT Fuel cells  
**Polymer electrolytes**  
Primary **batteries**  
Secondary **batteries**  
Sensors  
(multicomponent **composite** film and method for preparing the  
same)  
IT Fluoropolymers, uses  
Ionomers  
Linear low density polyethylenes  
Polyamides, uses  
Polycarbonates, uses  
Polyesters, uses  
Polyoxyalkylenes, uses  
Polyoxyphenylenes  
Polysiloxanes, uses  
Polysulfones, uses  
Polyurethanes, uses  
RL: TEM (Technical or engineered material use); USES (Uses)  
(multicomponent **composite** film and method for preparing the  
same)  
IT Capacitors  
(ultra; multicomponent **composite** film and method for preparing  
the same)  
IT 556-65-0, **Lithium** thiocyanate LiSCN 1303-86-2, Boron oxide  
B2O3, uses 1309-48-4, Magnesium oxide (MgO), uses 1344-28-1,  
Alumina, uses 7631-86-9, Silica, uses 7791-03-9,  
**Lithium** perchlorate LiClO4 13463-67-7, Titania, uses  
14283-07-9, **Lithium** tetrafluoroborate LiBF4 29935-35-1,  
**Lithium** hexafluoroarsenate LiAsF6 33454-82-9, **Lithium**  
trifluoromethanesulfonate 90076-65-6  
RL: MOA (Modifier or additive use); USES (Uses)  
(multicomponent **composite** film and method for preparing the

same)

IT 74-85-1D, Ethene, **polymers** with  $\alpha$ -olefins 9002-85-1, Polyvinylidene chloride 9002-88-4, Polyethylene 9003-01-4, Polyacrylic acid 9003-05-8, Polyacrylamide 9003-07-0, Polypropylene 9003-20-7, Polyvinyl acetate 9003-39-8, Polyvinylpyrrolidone 9003-53-6, Polystyrene 9010-75-7, Chlorotrifluoroethylene-vinylidene fluoride copolymer 9010-79-1, Ethylene-propylene copolymer 9011-14-7, Polymethyl methacrylate 9011-17-0, Hexafluoropropylene-vinylidene fluoride copolymer 9016-80-2, Polymethyl pentene 24937-79-9, Polyvinylidene fluoride **25014-41-9**, Polyacrylonitrile 25087-34-7, Ethylene-1-butenecopolymer 25190-06-1, Polybutylene oxide 25213-02-9, Ethylene-hexene copolymer 25322-68-3, Polyethylene oxide 25322-69-4, Polypropylene oxide 26221-73-8, Ethylene-octene copolymer 57619-91-7, Polytetraethylene glycol diacrylate 120246-23-3, Butylene-styrene block copolymer

RL: TEM (Technical or engineered material use); USES (Uses)  
(multicomponent **composite** film and method for preparing the same)

IT 25568-84-7D, Cyclopentadiene homopolymer, hydrogenated

RL: TEM (Technical or engineered material use); USES (Uses)  
(oligomeric; multicomponent **composite** film and method for preparing the same)

IT 9003-55-8

RL: TEM (Technical or engineered material use); USES (Uses)  
(styrene-butadiene rubber, hydrogenated, block, triblock; multicomponent **composite** film and method for preparing the same)

REFERENCE COUNT: 6 THERE ARE 6 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L23 ANSWER 15 OF 35 CAPLUS COPYRIGHT 2004 ACS on STN

ACCESSION NUMBER: 2001:935958 CAPLUS

DOCUMENT NUMBER: 136:56445

TITLE: Methods for preparation of microporous solid **electrolytes** for rechargeable **batteries**

INVENTOR(S): Jang, Dong Hun; Kim, Sa Heum; Kim, Han Jun

PATENT ASSIGNEE(S): Finecell Co., Ltd., S. Korea

SOURCE: PCT Int. Appl., 45 pp.

CODEN: PIXXD2

DOCUMENT TYPE: Patent

LANGUAGE: English

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 2001099220	A1	<u>20011227</u>	WO 2000-KR482	20000524
W: CN, JP, KR, US				
RW: AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE				
EP 1290749	A1	<u>20030312</u>	EP 2000-927894	20000524
R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT,				

IE, FI, CY

JP 2003536233

T2

20031202

JP 2002-503968

20000524

PRIORITY APPLN. INFO.:

WO 2000-KR482

W 20000524

AB The present invention is directed to an **electrolyte** film and/or a solid **electrolyte**, having a microporous structure, for a rechargeable cell. According to the present invention, when preparing the **electrolyte** film and/or the solid **electrolyte**, an inorg. absorbent is added in the amount of more than 70% by weight in a **polymer** matrix to prevent the porous structure from being destructed at the cell-assembling process such as lamination or pressing, whereby the absorbing power of a liquid **electrolyte** to the solid **electrolyte** film and the ionic conductivity can be maintained. The inorg. absorbent contained over the specific amount, together with the microporous structure, improves the capacity of absorbing the liquid **electrolyte** and, in particular, works as a structure element of increasing the mech. strength of **electrolyte** film and/or solid **electrolyte**. Therefore, the good ionic conductivity can be maintained even after the assembly of cell.

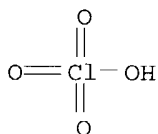
IT 7791-03-9, Lithium perchlorate

RL: DEV (Device component use); USES (Uses)

(methods for preparation of microporous solid **electrolytes** for rechargeable **batteries**)

RN 7791-03-9 CAPLUS

CN Perchloric acid, lithium salt (8CI, 9CI) (CA INDEX NAME)



● Li

IT 25014-41-9, Polyacrylonitrile

RL: MOA (Modifier or additive use); USES (Uses)

(methods for preparation of microporous solid **electrolytes** for rechargeable **batteries**)

RN 25014-41-9 CAPLUS

CN 2-Propenenitrile, homopolymer (9CI) (CA INDEX NAME)

CM 1

CRN 107-13-1

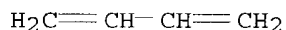
CMF C3 H3 N



IT 9003-18-3  
RL: MOA (Modifier or additive use); USES (Uses)  
(nitrile rubber, methods for preparation of microporous solid  
**electrolytes** for rechargeable **batteries**)  
RN 9003-18-3 CAPLUS  
CN 2-Propenenitrile, polymer with 1,3-butadiene (9CI) (CA INDEX NAME)  
  
CM 1  
  
CRN 107-13-1  
CMF C3 H3 N



CM 2  
  
CRN 106-99-0  
CMF C4 H6



IT 1344-28-1, Alumina, uses  
RL: MOA (Modifier or additive use); USES (Uses)  
(porous; methods for preparation of microporous solid **electrolytes**  
for rechargeable **batteries**)  
RN 1344-28-1 CAPLUS  
CN Aluminum oxide (Al<sub>2</sub>O<sub>3</sub>) (8CI, 9CI) (CA INDEX NAME)

\*\*\* STRUCTURE DIAGRAM IS NOT AVAILABLE \*\*\*

IC ICM H01M010-38  
CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
Section cross-reference(s): 38  
ST **battery** microporous solid **electrolyte** prepn  
IT Polyvinyl acetals  
RL: MOA (Modifier or additive use); USES (Uses)  
(formals; methods for preparation of microporous solid **electrolytes**  
for rechargeable **batteries**)  
IT Molecular sieves  
(mesoporous; methods for preparation of microporous solid  
**electrolytes** for rechargeable **batteries**)  
IT **Battery electrolytes**  
Ionic conductivity  
Secondary **batteries**  
(methods for preparation of microporous solid **electrolytes** for  
rechargeable **batteries**)  
IT Carbon black, uses  
Clay minerals

EPDM rubber  
 Fluoropolymers, uses  
 Mica-group minerals, uses  
 Nitrile rubber, uses  
 Phyllosilicate minerals  
 Polycarbonates, uses  
 Polycarbosilanes  
 Polyethers, uses  
 Polyimides, uses

**Polymers**, uses  
 Polyoxyalkylenes, uses  
 Polysulfones, uses  
 Polyurethanes, uses  
 Zeolites (synthetic), uses

RL: MOA (Modifier or additive use); USES (Uses)

(methods for preparation of microporous solid **electrolytes** for rechargeable **batteries**)

IT 96-48-0,  $\gamma$ -Butyrolactone 96-49-1, Ethylene carbonate 105-58-8, Diethyl carbonate 108-32-7, Propylene carbonate 111-96-6, Diglyme 112-49-2, Triglyme 126-33-0, Sulfolane 143-24-8, Tetraglyme 505-22-6, 1,3-Dioxane 556-65-0, **Lithium** thiocyanate 616-38-6, Dimethyl carbonate 623-53-0, Ethyl methyl carbonate 4437-85-8, Butylene carbonate 7429-90-5, Aluminum, uses 7440-50-8, Copper, uses 7782-42-5, Graphite, uses 7791-03-9, **Lithium** perchlorate 12057-17-9, **Lithium** manganese oxide  $\text{LiMn}_2\text{O}_4$  12190-79-3, Cobalt **lithium** oxide  $\text{CoLiO}_2$  14283-07-9, **Lithium** tetrafluoroborate 21324-40-3, **Lithium** hexafluorophosphate 29935-35-1, **Lithium** hexafluoroarsenate 33454-82-9, **Lithium** triflate 90076-65-6 132404-42-3

RL: DEV (Device component use); USES (Uses)

(methods for preparation of microporous solid **electrolytes** for rechargeable **batteries**)

IT 67-63-0, Isopropanol, uses 79-41-4D, Methacrylic acid, esters, **polymers** 1309-48-4, Magnesium oxide, uses 1318-93-0, Montmorillonite, uses 9002-86-2, Polyvinyl chloride 9002-88-4, Polyethylene 9002-89-5, Polyvinyl alcohol 9002-93-1, Triton x 100 9003-07-0, Polypropylene 9003-27-4, Polyisobutylene 9003-29-6, Polybutylene 9011-14-7, Pmma 9011-17-0, Hexafluoropropylene-vinylidene fluoride copolymer 9012-09-3, Cellulose triacetate 12026-53-8, Paragonite 17831-71-9, Tetraethylene glycol diacrylate 24937-79-9, Polyvinylidene fluoride **25014-41-9**, Polyacrylonitrile 25322-68-3, Peo 31900-57-9, Polydimethylsiloxane 114481-92-4, Maleic anhydride-vinylidene fluoride copolymer

RL: MOA (Modifier or additive use); USES (Uses)

(methods for preparation of microporous solid **electrolytes** for rechargeable **batteries**)

IT 56-81-5, Glycerol, uses 60-29-7, Ether, uses 64-17-5, Ethanol, uses 67-64-1, Acetone, uses 67-66-3, Chloroform, uses 67-68-5, DmsO, uses 68-12-2, Dmf, uses 75-05-8, Acetonitrile, uses 75-09-2, Dichloromethane, uses 96-47-9, 2-Methyltetrahydrofuran 107-21-1, Ethylene glycol, uses 108-94-1, Cyclohexanone, uses 109-99-9, Thf,



uses 123-91-1, Dioxane, uses 127-19-5, Dimethylacetamide 141-78-6, Ethyl acetate, uses 680-31-9, Hexamethylphosphoramide, uses 872-50-4, n-Methylpyrrolidone, uses 7732-18-5, Water, uses 25917-35-5, Hexanol 30899-19-5, Pentanol 35296-72-1, Butanol

RL: TEM (Technical or engineered material use); USES (Uses)  
(methods for preparation of microporous solid **electrolytes** for rechargeable **batteries**)

IT 9003-18-3

RL: MOA (Modifier or additive use); USES (Uses)  
(nitrile rubber, methods for preparation of microporous solid **electrolytes** for rechargeable **batteries**)

IT 1344-28-1, Alumina, uses 7631-86-9, Silica, uses

RL: MOA (Modifier or additive use); USES (Uses)  
(porous; methods for preparation of microporous solid **electrolytes** for rechargeable **batteries**)

REFERENCE COUNT: 5 THERE ARE 5 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L23 ANSWER 16 OF 35 CAPLUS COPYRIGHT 2004 ACS on STN

ACCESSION NUMBER: 2001:868873 CAPLUS

DOCUMENT NUMBER: 136:9101

TITLE: Fabrication method for **lithium** secondary **battery** with **polymer electrolyte** prepared by spray method

INVENTOR(S): Yun, Kyung Suk; Cho, Byung Won; Cho, Won Il; Kim, Hyung Sun; Kim, Un Seok

PATENT ASSIGNEE(S): Korea Institute of Science and Technology, S. Korea

SOURCE: PCT Int. Appl., 34 pp.

CODEN: PIXXD2

DOCUMENT TYPE: Patent

LANGUAGE: English

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

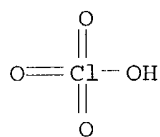
PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 2001091222	A1	20011129	WO 2000-KR515	20000522
W: JP, KR, US				

PRIORITY APPLN. INFO.: WO 2000-KR515 20000522

AB The present invention provides a **lithium** secondary **battery** and its fabrication method. More particularly, the present invention provides a **lithium** secondary **battery** comprising a porous **polymer electrolyte** and its fabrication method, wherein the **polymer electrolyte** is fabricated by the following process: (a) dissolving at least one **polymer** with plasticizers and organic **electrolyte** solvents to obtain at least one **polymeric electrolyte** solution; (b) adding the obtained **polymeric electrolyte** solution to a barrel of a spray machine, and (c) spraying the **polymeric electrolyte** solution onto a substrate using a nozzle to form a porous **polymer electrolyte** film. The **lithium** secondary **battery** of the present invention has advantages of

better adhesion with electrodes, good mech. strength, better performance at low and high temps., and better compatibility with organic electrolytes of a lithium secondary battery.

IT 7791-03-9, Lithium perchlorate 9010-76-8,  
 Acrylonitrile-vinylidene chloride copolymer 24968-79-4,  
 Acrylonitrile-methyl acrylate copolymer 25014-41-9,  
 Polyacrylonitrile  
 RL: DEV (Device component use); USES (Uses)  
 (fabrication method for lithium secondary battery  
 with polymer electrolyte prepared by spray method)  
 RN 7791-03-9 CAPLUS  
 CN Perchloric acid, lithium salt (8CI, 9CI) (CA INDEX NAME)

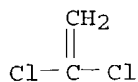


● Li

RN 9010-76-8 CAPLUS  
 CN 2-Propenenitrile, polymer with 1,1-dichloroethene (9CI) (CA INDEX NAME)  
 CM 1  
 CRN 107-13-1  
 CMF C3 H3 N



CM 2  
 CRN 75-35-4  
 CMF C2 H2 Cl2

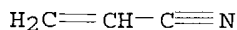


RN 24968-79-4 CAPLUS  
 CN 2-Propenoic acid, methyl ester, polymer with 2-propenenitrile (9CI) (CA INDEX NAME)

CM 1

CRN 107-13-1

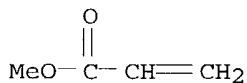
CMF C3 H3 N



CM 2

CRN 96-33-3

CMF C4 H6 O2



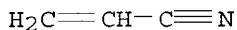
RN 25014-41-9 CAPLUS

CN 2-Propenenitrile, homopolymer (9CI) (CA INDEX NAME)

CM 1

CRN 107-13-1

CMF C3 H3 N



IT 1344-28-1, Alumina, uses 13463-67-7, Titania, uses  
RL: MOA (Modifier or additive use); USES (Uses)  
(filling agent; fabrication method for **lithium** secondary  
**battery** with **polymer electrolyte** prepared by  
spray method)

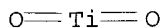
RN 1344-28-1 CAPLUS

CN Aluminum oxide (Al2O3) (8CI, 9CI) (CA INDEX NAME)

\*\*\* STRUCTURE DIAGRAM IS NOT AVAILABLE \*\*\*

RN 13463-67-7 CAPLUS

CN Titanium oxide (TiO2) (8CI, 9CI) (CA INDEX NAME)



IC ICM H01M010-38

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
Section cross-reference(s): 38

ST **polymer electrolyte lithium secondary battery; spray method fabrication polymer electrolyte lithium secondary battery**

IT Inductance  
(electrostatic, spray method; fabrication method for **lithium secondary battery with polymer electrolyte** prepared by spray method)

IT **Battery electrolytes**  
Lamination  
Plasticizers  
**Polymer electrolytes**  
(fabrication method for **lithium secondary battery with polymer electrolyte** prepared by spray method)

IT Fluoropolymers, uses  
Polyoxyalkylenes, uses  
RL: DEV (Device component use); USES (Uses)  
(fabrication method for **lithium secondary battery with polymer electrolyte** prepared by spray method)

IT Fluoropolymers, uses  
RL: MOA (Modifier or additive use); USES (Uses)  
(filling agent; fabrication method for **lithium secondary battery with polymer electrolyte** prepared by spray method)

IT **Secondary batteries**  
(**lithium**; fabrication method for **lithium secondary battery with polymer electrolyte** prepared by spray method)

IT Alcohols, uses  
RL: MOA (Modifier or additive use); USES (Uses)  
(plasticizer; fabrication method for **lithium secondary battery with polymer electrolyte** prepared by spray method)

IT Coating process  
(spray; fabrication method for **lithium secondary battery with polymer electrolyte** prepared by spray method)

IT 79-20-9, Methyl acetate 105-37-3, Ethyl propionate 109-99-9, Thf, uses 141-78-6, Ethyl acetate, uses 554-12-1, Methyl propionate 7782-42-5, Graphite, uses **7791-03-9, Lithium perchlorate** 9002-86-2, Pvc 9002-88-4, Polyethylene 9003-07-0, Polypropylene 9003-20-7, Polyvinyl acetate 9004-34-6, Cellulose, uses 9004-35-7, Cellulose acetate 9004-36-8 9004-39-1, Cellulose acetate propionate **9010-76-8, Acrylonitrile-vinylidene chloride copolymer** 9010-88-2, Ethyl acrylate-methylmethacrylate copolymer 9011-14-7, Pmma 9011-17-0, Hexafluoropropylene-vinylidene fluoride copolymer 12190-79-3, Cobalt **lithium oxide colio2** 14283-07-9, **Lithium tetrafluoroborate** 21324-40-3, **Lithium hexafluorophosphate** 24937-79-9, PvdF **24968-79-4, Acrylonitrile-methyl acrylate copolymer** 24980-34-5, Polyethylenesulfide **25014-41-9, Polyacrylonitrile** 25086-89-9, Vinyl acetate-vinyl pyrrolidone copolymer 25322-68-3, Peo 25322-69-4, Polypropylene oxide 25667-11-2, Polyethylenesuccinate 26913-06-4, Poly[imino(1,2-ethanediy)]

28726-47-8, Poly(oxyethylene-oxyethylene) 29935-35-1, **Lithium**  
hexafluoroarsenate 33454-82-9, **Lithium** triflate 98973-15-0,  
Poly[bis(2-(2-methoxyethoxyethoxy))-phosphazene]

RL: DEV (Device component use); USES (Uses)

(fabrication method for **lithium** secondary **battery**  
with **polymer electrolyte** prepared by spray method)

IT 554-13-2, **Lithium** carbonate 1304-28-5, Barium oxide bao, uses  
1309-48-4, Magnesia, uses 1310-65-2, **Lithium** hydroxide  
1313-59-3, Sodium oxide, uses 1344-28-1, Alumina, uses  
7631-86-9, Silica, uses 7789-24-4, **Lithium** fluoride, uses  
9002-84-0, Ptfе 12003-67-7, Aluminum **lithium** oxide allio2  
12047-27-7, Barium titanium oxide batio3, uses 12057-24-8, Lithia, uses  
13463-67-7, Titania, uses 26134-62-3, **Lithium** nitride

RL: MOA (Modifier or additive use); USES (Uses)

(filling agent; fabrication method for **lithium** secondary  
**battery** with **polymer electrolyte** prepared by  
spray method)

IT 67-64-1, Acetone, uses 67-68-5, Dmsо, uses 68-12-2, Dmf, uses  
80-73-9, 1,3-Dimethyl-2-imidazolidinone 96-48-0, Butyrolactone  
96-49-1, Ethylene carbonate 105-58-8, Diethyl carbonate 108-32-7,  
Propylene carbonate 110-71-4, 1,2-Dimethoxyethane 127-19-5,  
n,n-Dimethyl acetamide 143-24-8, Tetraethylene glycol dimethyl ether  
616-38-6, Dimethyl carbonate 623-53-0, Ethyl methyl carbonate  
872-50-4, n-Methyl-2-pyrrolidone, uses 4437-85-8, Butylene carbonate  
26101-52-0

RL: MOA (Modifier or additive use); USES (Uses)

(plasticizer; fabrication method for **lithium** secondary  
**battery** with **polymer electrolyte** prepared by  
spray method)

REFERENCE COUNT: 10 THERE ARE 10 CITED REFERENCES AVAILABLE FOR THIS  
RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L23 ANSWER 17 OF 35 CAPLUS COPYRIGHT 2004 ACS on STN

ACCESSION NUMBER: 2001:868872 CAPLUS

DOCUMENT NUMBER: 136:9100

TITLE: A **lithium** secondary **battery**  
comprising **composite polymer**  
**electrolyte** fabricated by a spray method

INVENTOR(S): Yun, Kyung Suk; Cho, Byung Won; Cho, Won Il; Kim,  
Hyung Sun; Kim, Un Seok

PATENT ASSIGNEE(S): Korea Institute of Science and Technology, S. Korea

SOURCE: PCT Int. Appl., 38 pp.

CODEN: PIXXD2

DOCUMENT TYPE: Patent

LANGUAGE: English

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 2001091221	A1	20011129	WO 2000-KR514	20000522
W: JP, KR, US				

PRIORITY APPLN. INFO.: WO 2000-KR514 20000522

AB The present invention provides a novel **composite polymer electrolyte, lithium secondary battery** comprising the **composite polymer electrolyte** and their fabrication methods. More particularly, the present invention provides the **composite polymer electrolyte** comprising a porous **polymer electrolyte** matrix with particles, fibers or mixture thereof having diams. of 1-3000 nm, **polymers** and **lithium salt-dissolved organic electrolyte** solns. incorporated into the porous **polymer** matrix. The **composite polymer electrolyte** of the present invention has advantages of better adhesion with electrodes, good mech. strength, better performance at low and high temps., better compatibility with organic **electrolytes** of **lithium secondary battery** and it can be applied to the manufacture of **lithium secondary batteries**.

IT 1344-28-1, Alumina, uses 13463-67-7, Titania, uses  
 RL: MOA (Modifier or additive use); USES (Uses)  
 (filling agent; **lithium secondary battery**  
 comprising **composite polymer electrolyte**  
 fabricated by spray method)

RN 1344-28-1 CAPLUS

CN Aluminum oxide (Al<sub>2</sub>O<sub>3</sub>) (8CI, 9CI) (CA INDEX NAME)

\*\*\* STRUCTURE DIAGRAM IS NOT AVAILABLE \*\*\*

RN 13463-67-7 CAPLUS

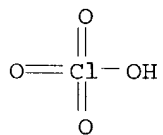
CN Titanium oxide (TiO<sub>2</sub>) (8CI, 9CI) (CA INDEX NAME)

O—Ti=O

IT 7791-03-9, **Lithium perchlorate** 9010-76-8,  
 Acrylonitrile-vinylidene chloride copolymer 24968-79-4,  
 Acrylonitrile-methylacrylate copolymer 25014-41-9,  
 Polyacrylonitrile  
 RL: DEV (Device component use); USES (Uses)  
 (**lithium secondary battery** comprising  
**composite polymer electrolyte** fabricated by  
 spray method)

RN 7791-03-9 CAPLUS

CN Perchloric acid, lithium salt (8CI, 9CI) (CA INDEX NAME)

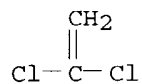


● Li

RN 9010-76-8 CAPLUS  
CN 2-Propenenitrile, polymer with 1,1-dichloroethene (9CI) (CA INDEX NAME)  
CM 1  
CRN 107-13-1  
CMF C3 H3 N



CM 2  
CRN 75-35-4  
CMF C2 H2 Cl2

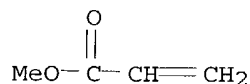


RN 24968-79-4 CAPLUS  
CN 2-Propenoic acid, methyl ester, polymer with 2-propenenitrile (9CI) (CA INDEX NAME)  
CM 1  
CRN 107-13-1  
CMF C3 H3 N



CM 2  
CRN 96-33-3

CMF C4 H6 O2



RN 25014-41-9 CAPLUS  
CN 2-Propenenitrile, homopolymer (9CI) (CA INDEX NAME)

CM 1

CRN 107-13-1  
CMF C3 H3 N



IC ICM H01M010-38  
CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
Section cross-reference(s): 38  
ST **lithium secondary battery composite  
polymer electrolyte**; spray method fabrication  
**composite polymer electrolyte**  
IT Inductance  
(electrostatic induction spray; **lithium secondary  
battery** comprising **composite polymer  
electrolyte** fabricated by spray method)  
IT Fluoropolymers, uses  
RL: MOA (Modifier or additive use); USES (Uses)  
(filling agent; **lithium secondary battery  
comprising composite polymer electrolyte**  
fabricated by spray method)  
IT **Battery electrolytes**  
Plasticizers  
**Polymer electrolytes**  
(**lithium secondary battery** comprising  
**composite polymer electrolyte** fabricated by  
spray method)  
IT Fluoropolymers, uses  
Polyoxyalkylenes, uses  
RL: DEV (Device component use); USES (Uses)  
(**lithium secondary battery** comprising  
**composite polymer electrolyte** fabricated by  
spray method)  
IT **Secondary batteries**  
(**lithium; lithium secondary battery**  
comprising **composite polymer electrolyte**  
fabricated by spray method)  
IT Alcohols, uses



RL: MOA (Modifier or additive use); USES (Uses)  
 (plasticizer; **lithium secondary battery** comprising  
**composite polymer electrolyte** fabricated by  
 spray method)

IT Coating process

(spray; **lithium secondary battery** comprising  
**composite polymer electrolyte** fabricated by  
 spray method)

IT 554-13-2, **Lithium** carbonate 1304-28-5, Barium oxide bao, uses  
 1309-48-4, Magnesia, uses 1310-65-2, **Lithium** hydroxide  
 1313-59-3, Sodium oxide na2o, uses 1344-28-1, Alumina, uses  
 7631-86-9, Silica, uses 7789-24-4, **Lithium** fluoride, uses  
 9002-84-0, Ptfе 12003-67-7, Aluminum **lithium** oxide allio2  
 12047-27-7, Barium titanium oxide batio3, uses 12057-24-8, Lithia, uses  
 13463-67-7, Titania, uses 26134-62-3, **Lithium** nitride

RL: MOA (Modifier or additive use); USES (Uses)  
 (filling agent; **lithium secondary battery**  
 comprising **composite polymer electrolyte**  
 fabricated by spray method)

IT 79-20-9, Methyl acetate 96-48-0,  $\gamma$ -Butyrolactone 96-49-1,  
 Ethylene carbonate 105-37-3, Ethyl propionate 105-58-8, Diethyl  
 carbonate 108-32-7, Propylene carbonate 109-99-9, Thf, uses  
 110-71-4, 1,2-Dimethoxyethane 127-19-5, Dimethyl acetamide 141-78-6,  
 Ethyl acetate, uses 554-12-1, Methyl propionate 616-38-6, Dimethyl  
 carbonate 623-53-0, Ethyl methyl carbonate 4437-85-8, Butylene  
 carbonate 7782-42-5, Graphite, uses 7791-03-9, **Lithium**  
 perchlorate 9002-86-2, Pvc 9002-88-4, Polyethylene 9003-07-0,  
 Polypropylene 9003-20-7, Polyvinyl acetate 9004-34-6, Cellulose, uses  
 9004-35-7, Cellulose acetate 9004-36-8 9004-39-1, Cellulose acetate  
 propionate 9010-76-8, Acrylonitrile-vinylidene chloride  
 copolymer 9010-88-2, Ethyl acrylate-methyl methacrylate copolymer  
 9011-14-7, Pmma 9011-17-0, Hexafluoropropylene-vinylidenefluoride  
 copolymer 12190-79-3, Cobalt **lithium** oxide colio2  
 14283-07-9, **Lithium** tetrafluoroborate 21324-40-3,  
**Lithium** hexafluorophosphate 24937-79-9, Pvdф 24968-79-4  
 , Acrylonitrile-methylacrylate copolymer 24980-34-5, Polyethylene  
 sulfide 25014-41-9, Polyacrylonitrile 25086-89-9, Vinyl  
 acetate-vinylpyrrolidone copolymer 25322-68-3, Peo 25322-69-4,  
 Polypropylene oxide 25667-11-2, Polyethylenesuccinate 25721-76-0,  
 Polyethylene glycol dimethacrylate 26913-06-4, Poly[imino(1,2-  
 ethanediyl)] 28726-47-8, Poly(oxyethylene-oxyethylene) 29935-35-1,  
**Lithium** hexafluoroarsenate 33454-82-9, **Lithium**  
 triflate 98973-15-0, Poly[bis(2-(2-methoxyethoxyethoxy))phosphazene]

RL: DEV (Device component use); USES (Uses)

(**lithium secondary battery** comprising  
**composite polymer electrolyte** fabricated by  
 spray method)

IT 67-64-1, Acetone, uses 67-68-5, Dmsо, uses 68-12-2, Dmf, uses  
 80-73-9, 1,3-Dimethyl-2-imidazolidinone 143-24-8, Tetraethylene glycol  
 dimethyl ether 872-50-4, n-Methyl-2-pyrrolidone, uses 26101-52-0

RL: MOA (Modifier or additive use); USES (Uses)

(plasticizer; **lithium secondary battery** comprising

**composite polymer electrolyte** fabricated by  
spray method)

REFERENCE COUNT: 12 THERE ARE 12 CITED REFERENCES AVAILABLE FOR THIS  
RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L23 ANSWER 18 OF 35 CAPLUS COPYRIGHT 2004 ACS on STN  
ACCESSION NUMBER: 2001:868871 CAPLUS  
DOCUMENT NUMBER: 136:9099  
TITLE: Fabrication of a **lithium** secondary  
**battery** comprising a hybrid **polymer**  
**electrolyte** prepared by a spray method  
INVENTOR(S): Yun, Kyung Suk; Cho, Byung Won; Cho, Won Il; Kim,  
Hyung Sun; Kim, Un Seok  
PATENT ASSIGNEE(S): Korea Institute of Science and Technology, S. Korea  
SOURCE: PCT Int. Appl., 39 pp.  
CODEN: PIXXD2  
DOCUMENT TYPE: Patent  
LANGUAGE: English  
FAMILY ACC. NUM. COUNT: 1  
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 2001091220	A1	20011129	WO 2000-KR513	20000522

W: JP, KR, US

PRIORITY APPLN. INFO.: WO 2000-KR513 20000522

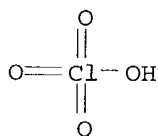
AB The present invention provides a novel hybrid **polymer**  
**electrolyte**, a **lithium** secondary **battery**  
comprising the hybrid **polymer electrolyte** and their  
fabrication methods. More particularly, the present invention provides  
the hybrid **polymer electrolyte** comprising a porous  
**polymer** matrix with particles, fibers or mixture thereof having  
diams. of 1-3000 nm, **polymers** and **lithium**  
salt-dissolved organic **electrolyte** solns. incorporated into the  
porous **polymer** matrix. The hybrid **polymer**  
**electrolyte** has advantages of better adhesion with electrodes,  
good mech. strength, better performance at low- and high-temps., better  
compatibility with organic **electrolytes** of a **lithium**  
secondary **battery** and it can be applied to the manufacture of  
**lithium** secondary **batteries**.

IT 7791-03-9, **Lithium** perchlorate 9010-76-8,  
Acrylonitrile-vinylidene chloride copolymer 24968-79-4,  
Acrylonitrile-methylacrylate copolymer 25014-41-9,  
Polyacrylonitrile

RL: DEV (Device component use); USES (Uses)  
(fabrication of **lithium** secondary **battery**  
comprising hybrid **polymer electrolyte** prepared by  
spray method)

RN 7791-03-9 CAPLUS

CN Perchloric acid, lithium salt (8CI, 9CI) (CA INDEX NAME)

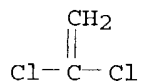


● Li

RN 9010-76-8 CAPLUS  
 CN 2-Propenenitrile, polymer with 1,1-dichloroethene (9CI) (CA INDEX NAME)  
 CM 1  
 CRN 107-13-1  
 CMF C3 H3 N



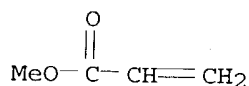
CM 2  
 CRN 75-35-4  
 CMF C2 H2 Cl2



RN 24968-79-4 CAPLUS  
 CN 2-Propenoic acid, methyl ester, polymer with 2-propenenitrile (9CI) (CA INDEX NAME)  
 CM 1  
 CRN 107-13-1  
 CMF C3 H3 N



CM 2  
 CRN 96-33-3  
 CMF C4 H6 O2



RN 25014-41-9 CAPLUS  
 CN 2-Propenenitrile, homopolymer (9CI) (CA INDEX NAME)  
 CM 1  
 CRN 107-13-1  
 CMF C3 H3 N

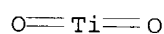


IT 1344-28-1, Alumina, uses 13463-67-7, Titania, uses  
 RL: MOA (Modifier or additive use); USES (Uses)  
 (filling agent; fabrication of **lithium secondary battery** comprising hybrid **polymer electrolyte** prepared by spray method)

RN 1344-28-1 CAPLUS  
 CN Aluminum oxide (Al<sub>2</sub>O<sub>3</sub>) (8CI, 9CI) (CA INDEX NAME)

\*\*\* STRUCTURE DIAGRAM IS NOT AVAILABLE \*\*\*

RN 13463-67-7 CAPLUS  
 CN Titanium oxide (TiO<sub>2</sub>) (8CI, 9CI) (CA INDEX NAME)



IC ICM H01M010-38  
 CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
 Section cross-reference(s): 38  
 ST **lithium secondary battery hybrid polymer electrolyte; spray method hybrid polymer electrolyte lithium secondary battery**  
 IT Inductance  
 (electrostatic, spray method; fabrication of **lithium secondary battery** comprising hybrid **polymer electrolyte** prepared by spray method)  
 IT **Battery electrolytes**  
 Plasticizers  
**Polymer electrolytes**  
 (fabrication of **lithium secondary battery** comprising hybrid **polymer electrolyte** prepared by spray method)  
 IT Fluoropolymers, uses

- Polyoxyalkylenes, uses  
 RL: DEV (Device component use); USES (Uses)  
 (fabrication of **lithium** secondary **battery** comprising hybrid **polymer electrolyte** prepared by spray method)
- IT Fluoropolymers, uses  
 RL: MOA (Modifier or additive use); USES (Uses)  
 (filling agent; fabrication of **lithium** secondary **battery** comprising hybrid **polymer electrolyte** prepared by spray method)
- IT Secondary **batteries**  
 (**lithium**; fabrication of **lithium** secondary **battery** comprising hybrid **polymer electrolyte** prepared by spray method)
- IT Alcohols, uses  
 RL: MOA (Modifier or additive use); USES (Uses)  
 (plasticizer; fabrication of **lithium** secondary **battery** comprising hybrid **polymer electrolyte** prepared by spray method)
- IT Coating process  
 (spray; fabrication of **lithium** secondary **battery** comprising hybrid **polymer electrolyte** prepared by spray method)
- IT 79-20-9, Methyl acetate 96-48-0,  $\gamma$ -Butyrolactone 96-49-1, Ethylene carbonate 105-37-3, Ethyl propionate 105-58-8, Diethyl carbonate 108-32-7, Propylene carbonate 109-99-9, Thf, uses 110-71-4, 1,2-Dimethoxyethane 127-19-5, Dimethyl acetamide 141-78-6, Ethyl acetate, uses 554-12-1, Methyl propionate 616-38-6, Dimethyl carbonate 623-53-0, Ethyl methyl carbonate 4437-85-8, Butylene carbonate 7782-42-5, Graphite, uses 7791-03-9, **Lithium** perchlorate 9002-86-2, Pvc 9002-88-4, Polyethylene 9003-07-0, Polypropylene 9003-20-7, Polyvinyl acetate 9004-34-6, Cellulose, uses 9004-35-7, Cellulose acetate 9004-36-8 9004-39-1, Cellulose acetate propionate 9010-76-8, Acrylonitrile-vinylidene chloride copolymer 9010-88-2, Ethyl acrylate-methyl methacrylate copolymer 9011-14-7, Pmma 9011-17-0, Hexafluoropropylene-vinylidene fluoride copolymer 12190-79-3, Cobalt **lithium** oxide colio2 14283-07-9, **Lithium** tetrafluoroborate 21324-40-3, **Lithium** hexafluorophosphate 24936-67-2, Polyethylene sulfide 24937-79-9, Polyvinylidene fluoride 24968-79-4, Acrylonitrile-methylacrylate copolymer 25014-41-9, Polyacrylonitrile 25086-89-9, Vinyl acetate-vinylpyrrolidone copolymer 25322-68-3, Peo 25322-69-4, Polypropylene oxide 25667-11-2, Polyethylene succinate 26570-48-9, Polyethylene glycol diacrylate 26913-06-4, Poly[imino(1,2-ethanediyl)] 28726-47-8, Poly(oxyethyleneoxyethylene) 29935-35-1, **Lithium** hexafluoroarsenate 33454-82-9, **Lithium** triflate 98973-15-0, Poly[bis(2-(2-methoxyethoxyethoxy))phosphazene]  
 RL: DEV (Device component use); USES (Uses)  
 (fabrication of **lithium** secondary **battery** comprising hybrid **polymer electrolyte** prepared by spray method)

IT 68-12-2, Dmf, uses 872-50-4, n-Methyl-2-pyrrolidone, uses 26101-52-0  
 RL: MOA (Modifier or additive use); USES (Uses)  
 (fabrication of **lithium** secondary **battery**  
 comprising hybrid **polymer electrolyte** prepared by  
 spray method)

IT 554-13-2, **Lithium** carbonate 1304-28-5, Barium oxide bao, uses  
 1309-48-4, Magnesia, uses 1310-65-2, **Lithium** hydroxide  
 1313-59-3, Sodium oxide na2o, uses 1344-28-1, Alumina, uses  
 7631-86-9, Silica, uses 7789-24-4, **Lithium** fluoride, uses  
 9002-84-0, Ptfе 12003-67-7, Aluminum **lithium** oxide allio2  
 12047-27-7, Barium titanium oxide batio3, uses 12057-24-8, Lithia, uses  
 13463-67-7, Titania, uses 26134-62-3, **Lithium** nitride  
 RL: MOA (Modifier or additive use); USES (Uses)  
 (filling agent; fabrication of **lithium** secondary  
**battery** comprising hybrid **polymer electrolyte**  
 prepared by spray method)

IT 67-64-1, Acetone, uses 67-68-5, Dmsо, uses 80-73-9,  
 1,3-Dimethyl-2-imidazolidinone 143-24-8, Tetraethylene glycol dimethyl  
 ether  
 RL: MOA (Modifier or additive use); USES (Uses)  
 (plasticizer; fabrication of **lithium** secondary  
**battery** comprising hybrid **polymer electrolyte**  
 prepared by spray method)

REFERENCE COUNT: 12 THERE ARE 12 CITED REFERENCES AVAILABLE FOR THIS  
 RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L23 ANSWER 19 OF 35 CAPLUS COPYRIGHT 2004 ACS on STN  
 ACCESSION NUMBER: 2001:868870 CAPLUS  
 DOCUMENT NUMBER: 136:9098  
 TITLE: A **lithium** secondary **battery**  
 comprising a porous **polymer** separator film  
 fabricated by a spray method

INVENTOR(S): Yun, Kyung Suk; Cho, Byung Won; Cho, Won Il; Kim,  
 Hyung Sun; Kim, Un Seok

PATENT ASSIGNEE(S): Korea Institute of Science and Technology, S. Korea

SOURCE: PCT Int. Appl., 36 pp.  
 CODEN: PIXXD2

DOCUMENT TYPE: Patent

LANGUAGE: English

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 2001091219	A1	20011129	WO 2000-KR512	20000522
W: JP, KR, US				
PRIORITY APPLN. INFO.:			WO 2000-KR512	20000522
AB The present invention provides a <b>lithium</b> secondary <b>battery</b> and its fabrication method. More particularly, the present invention provides a <b>lithium</b> secondary <b>battery</b> comprising a porous <b>polymer</b> separator film and its fabrication method, wherein the porous <b>polymer</b> separator film is fabricated				

by the following process : (a) melting at least one **polymer** or dissolving at least one **polymer** with an organic solvent to obtain at least one **polymeric** melt or at least one **polymeric** solution; (b) adding the obtained **polymeric** melt or **polymeric** solution to barrels of a spray machine; and (c) spraying the **polymeric** melt or **polymeric** solution onto a substrate using a nozzle to form a porous separator film. The **lithium** secondary **battery** of the present invention has advantages of better adhesion with electrodes, good mech. strength, better performance at low and high temps., and better compatibility with an organic **electrolyte** solution of a **lithium** secondary **battery**

IT 1344-28-1, Alumina, uses 13463-67-7, Titania, uses  
 RL: MOA (Modifier or additive use); USES (Uses)  
 (filling agent; **lithium** secondary **battery**  
 comprising porous **polymer** separator film fabricated by spray  
 method)

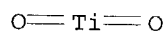
RN 1344-28-1 CAPLUS

CN Aluminum oxide (Al2O3) (8CI, 9CI) (CA INDEX NAME)

\*\*\* STRUCTURE DIAGRAM IS NOT AVAILABLE \*\*\*

RN 13463-67-7 CAPLUS

CN Titanium oxide (TiO2) (8CI, 9CI) (CA INDEX NAME)

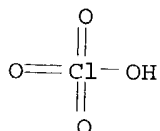


IT 7791-03-9, **Lithium** perchlorate 9010-76-8,  
 Acrylonitrile-vinylidene chloride copolymer 24968-79-4,  
 Acrylonitrile-methylacrylate copolymer 25014-41-9,  
 Polyacrylonitrile

RL: DEV (Device component use); USES (Uses)  
 (**lithium** secondary **battery** comprising porous  
**polymer** separator film fabricated by spray method)

RN 7791-03-9 CAPLUS

CN Perchloric acid, lithium salt (8CI, 9CI) (CA INDEX NAME)



● Li

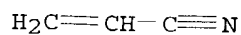
RN 9010-76-8 CAPLUS

CN 2-Propenenitrile, polymer with 1,1-dichloroethene (9CI) (CA INDEX NAME)

CM 1

CRN 107-13-1

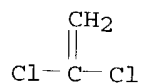
CMF C3 H3 N



CM 2

CRN 75-35-4

CMF C2 H2 C12



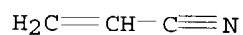
RN 24968-79-4 CAPLUS

CN 2-Propenoic acid, methyl ester, polymer with 2-propenenitrile (9CI) (CA INDEX NAME)

CM 1

CRN 107-13-1

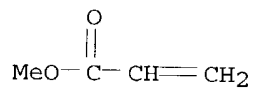
CMF C3 H3 N



CM 2

CRN 96-33-3

CMF C4 H6 O2



RN 25014-41-9 CAPLUS

CN 2-Propenenitrile, homopolymer (9CI) (CA INDEX NAME)

CM 1

CRN 107-13-1



CMF C3 H3 N



- IC ICM H01M010-38
- CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
Section cross-reference(s): 38
- ST **lithium secondary battery porous polymer separator**
- IT Inductance  
(electrostatic induction; **lithium secondary battery** comprising porous **polymer separator** film fabricated by spray method)
- IT Fluoropolymers, uses  
RL: MOA (Modifier or additive use); USES (Uses)  
(filling agent; **lithium secondary battery** comprising porous **polymer separator** film fabricated by spray method)
- IT Secondary **battery** separators  
(**lithium secondary battery** comprising porous **polymer separator** film fabricated by spray method)
- IT Alcohols, uses  
Fluoropolymers, uses  
Polyoxyalkylenes, uses  
RL: DEV (Device component use); USES (Uses)  
(**lithium secondary battery** comprising porous **polymer separator** film fabricated by spray method)
- IT Secondary **batteries**  
(**lithium; lithium secondary battery** comprising porous **polymer separator** film fabricated by spray method)
- IT Coating process  
(spray; **lithium secondary battery** comprising porous **polymer separator** film fabricated by spray method)
- IT 554-13-2, **Lithium carbonate** 1304-28-5, Baria, uses  
1309-48-4, Magnesia, uses 1310-65-2, **Lithium hydroxide**  
1313-59-3, Sodium oxide na2o, uses 1344-28-1, Alumina, uses  
7631-86-9, Silica, uses 7789-24-4, **Lithium fluoride**, uses  
9002-84-0, Ptfе 12003-67-7, Aluminum **lithium oxide** allio2  
12047-27-7, Barium titanium oxide batio3, uses 12057-24-8, Lithia, uses  
13463-67-7, Titania, uses 26134-62-3, **Lithium nitride**  
RL: MOA (Modifier or additive use); USES (Uses)  
(filling agent; **lithium secondary battery** comprising porous **polymer separator** film fabricated by spray method)
- IT 67-64-1, Acetone, uses 67-68-5, Dmsо, uses 68-12-2, Dmf, uses  
79-20-9, Methyl acetate 80-73-9, 1,3-Dimethyl-2-imidazolidinone  
96-48-0, Butyrolactone 96-49-1, Ethylene carbonate 105-37-3, Ethyl propionate 105-58-8, Diethyl carbonate 108-32-7, Propylene carbonate  
109-99-9, Thf, uses 110-71-4, 1,2-Dimethoxyethane 127-19-5,

n,n-Dimethylacetamide 141-78-6, Ethyl acetate, uses 143-24-8,  
 Tetraethylene glycol dimethyl ether 554-12-1, Methyl propionate  
 616-38-6, Dimethyl carbonate 623-53-0, Ethyl methyl carbonate  
 872-50-4, n-Methyl-2-pyrrolidone, uses 4437-85-8, Butylene carbonate  
 7782-42-5, Graphite, uses **7791-03-9, Lithium**  
 perchlorate 9002-86-2, Pvc 9002-88-4, Polyethylene 9003-07-0,  
 Polypropylene 9003-20-7, Polyvinyl acetate 9004-34-6, Cellulose, uses  
 9004-35-7, Cellulose acetate 9004-36-8 9004-39-1, Cellulose acetate  
 propionate **9010-76-8**, Acrylonitrile-vinylidene chloride  
 copolymer 9010-88-2, Ethyl acrylate-methyl methacrylate copolymer  
 9011-14-7, Pmma 9011-17-0, Hexafluoropropylene-vinylidene fluoride  
 copolymer 12190-79-3, Cobalt **lithium** oxide colio2  
 14283-07-9, **Lithium** tetrafluoroborate 21324-40-3,  
**Lithium** hexafluorophosphate 24937-79-9, PvdF **24968-79-4**  
 , Acrylonitrile-methylacrylate copolymer 24980-34-5, Polyethylene  
 sulfide **25014-41-9**, Polyacrylonitrile 25086-89-9, Vinyl  
 acetate-vinylpyrrolidone copolymer 25322-68-3, Peo 25322-69-4,  
 Polypropylene oxide 25667-11-2, Polyethylene succinate 26101-52-0  
 26913-06-4, Poly[imino(1,2-ethanediyl)] 28726-47-8,  
 Poly(Oxymethyleneoxyethylene) 29935-35-1, **Lithium**  
 hexafluoroarsenate 33454-82-9, **Lithium** triflate 98973-15-0,  
 Poly[bis(2-(2-methoxyethoxyethoxy))phosphazene]  
 RL: DEV (Device component use); USES (Uses)

(**lithium** secondary **battery** comprising porous  
**polymer** separator film fabricated by spray method)

REFERENCE COUNT: 12 THERE ARE 12 CITED REFERENCES AVAILABLE FOR THIS  
 RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

*Handwritten:* Data

L23 ANSWER 20 OF 35 CAPLUS COPYRIGHT 2004 ACS on STN  
 ACCESSION NUMBER: 2001:865066 CAPLUS  
 DOCUMENT NUMBER: 136:8988  
 TITLE: Gel **electrolytic** precursor and manufacturing  
 of non-aqueous secondary **battery**  
 INVENTOR(S): Hibino, Seiji; Kano, Koji; Iwahisa, Masahiro  
 PATENT ASSIGNEE(S): Toshiba Battery Co., Ltd., Japan  
 SOURCE: Jpn. Kokai Tokkyo Koho, 8 pp.  
 CODEN: JKXXAF  
 DOCUMENT TYPE: Patent  
 LANGUAGE: Japanese  
 FAMILY ACC. NUM. COUNT: 1  
 PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
JP 2001332303	A2	<u>20011130</u>	JP 2000-150171	20000522
PRIORITY APPLN. INFO.:			JP 2000-150171	20000522

AB The title **battery** consists of a pos. electrode, a neg.  
 electrode, and a gel **electrolytic** layer disposed between the  
 pos. and neg. electrodes. The porous gel **electrolytic** precursor  
 contains a 1st **polymer** which is barely disol. in a non-aqueous  
**electrolytic** solution and a 2nd **polymer** of gel-formable in  
 a non-aqueous **electrolytic** solution The volume ratio of the 2nd

polymer to the 1st polymer is in the range of 0.1-5.

The expansion rate of the 1st polymer is  $\leq 30\%$ .

IT 1344-28-1, Alumina, uses 7791-03-9, Lithium  
perchlorate 24980-62-9, Acrylonitrile vinyl acetate copolymer  
25014-41-9, Polyacrylonitrile 25053-12-7, Acrylonitrile  
ethylacrylate copolymer

RL: DEV (Device component use); USES (Uses)

(gel electrolytic precursor and manufacturing of non-aqueous secondary  
battery)

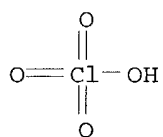
RN 1344-28-1 CAPLUS

CN Aluminum oxide (Al<sub>2</sub>O<sub>3</sub>) (8CI, 9CI) (CA INDEX NAME)

\*\*\* STRUCTURE DIAGRAM IS NOT AVAILABLE \*\*\*

RN 7791-03-9 CAPLUS

CN Perchloric acid, lithium salt (8CI, 9CI) (CA INDEX NAME)



● Li

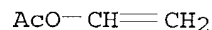
RN 24980-62-9 CAPLUS

CN Acetic acid ethenyl ester, polymer with 2-propenenitrile (9CI) (CA INDEX  
NAME)

CM 1

CRN 108-05-4

CMF C4 H6 O2



CM 2

CRN 107-13-1

CMF C3 H3 N



RN 25014-41-9 CAPLUS

CN 2-Propenenitrile, homopolymer (9CI) (CA INDEX NAME)

CM 1

CRN 107-13-1

CMF C3 H3 N



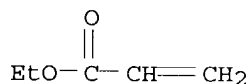
RN 25053-12-7 CAPLUS

CN 2-Propenoic acid, ethyl ester, polymer with 2-propenenitrile (9CI) (CA INDEX NAME)

CM 1

CRN 140-88-5

CMF C5 H8 O2



CM 2

CRN 107-13-1

CMF C3 H3 N



IC ICM H01M010-40

ICS C08K003-16; C08K003-24; C08K003-32; C08K003-38; C08K005-42;  
C08L023-08; C08L025-12; C08L027-16; C08L027-20; C08L033-20;  
C08L055-02; C08L071-02

CC 52-1 (Electrochemical, Radiational, and Thermal Energy Technology)  
Section cross-reference(s): 72

ST gel **electrolytic** precursor nonaq secondary **battery**

IT Secondary **batteries**

(gel **electrolytic** precursor and manufacturing of non-aqueous secondary **battery**)

IT Carbon black, uses

Carbon fibers, uses

Fluoropolymers, uses

Phenolic resins, uses

**Polymers**, uses

Polyoxyalkylenes, uses

RL: DEV (Device component use); USES (Uses)

(gel **electrolytic** precursor and manufacturing of non-aqueous secondary **battery**)

IT 68-12-2, Dmf, uses 872-50-4, N-Methyl-2-pyrrolidone, uses 1313-13-9, Manganese dioxide, uses 1314-62-1, Vanadium oxide, uses 1317-33-5, Molybdenum disulfide, uses **1344-28-1**, Alumina, uses 7440-02-0, Nickel, uses 7440-50-8, Copper, uses 7782-42-5, Graphite, uses **7791-03-9**, Lithium perchlorate 9004-34-6, Cellulose, uses 9011-17-0 12031-65-1, **Lithium** nickel oxide (LiNiO<sub>2</sub>) 12039-13-3, Titanium disulfide 12057-17-9, **Lithium** manganese oxide (LiMn<sub>2</sub>O<sub>4</sub>) 12190-79-3, **Lithium** cobalt oxide (LiCoO<sub>2</sub>) 14283-07-9 21324-40-3 24937-78-8, Ethylene vinyl acetate copolymer 24937-79-9, Polyvinylidene fluoride **24980-62-9**, Acrylonitrile vinyl acetate copolymer **25014-41-9**, Polyacrylonitrile **25053-12-7**, Acrylonitrile ethylacrylate copolymer 25322-68-3, Polyethylene oxide 25322-69-4, Polypropylene oxide 29935-35-1 33454-82-9

RL: DEV (Device component use); USES (Uses)

(gel **electrolytic** precursor and manufacturing of non-aqueous secondary **battery**)

IT 78-93-3, Methyl ethyl ketone, uses 108-88-3, Toluene, uses 109-99-9, Tetrahydrofuran, uses

RL: TEM (Technical or engineered material use); USES (Uses)

(gel **electrolytic** precursor and manufacturing of non-aqueous secondary **battery**)

L23 ANSWER 21 OF 35 CAPLUS COPYRIGHT 2004 ACS on STN

ACCESSION NUMBER: 2001:865065 CAPLUS

DOCUMENT NUMBER: 136:8987

TITLE: Gel **electrolytic** precursor and manufacturing of non-aqueous secondary **battery**

INVENTOR(S): Hibino, Seiji; Iwahisa, Masahiro; Kano, Koji

PATENT ASSIGNEE(S): Toshiba Battery Co., Ltd., Japan

SOURCE: Jpn. Kokai Tokkyo Koho, 9 pp.

CODEN: JKXXAF

DOCUMENT TYPE: Patent

LANGUAGE: Japanese

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
JP 2001332302	A2	20011130	JP 2000-150170	20000522
PRIORITY APPLN. INFO.:			JP 2000-150170	20000522

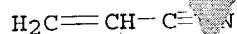
AB The title **battery** consists of a pos. electrode, a neg. electrode, and a gel **electrolytic** layer disposed between the pos. and neg. electrodes. The porous gel **electrolytic** precursor contains a 1st **polymer** which is barely disol. in a non-aqueous **electrolytic** solution and a 2nd **polymer** of gel-formable in a non-aqueous **electrolytic** solution. The precursor is soaked with a non-aqueous **electrolytic** solution, followed by heating and cooling to form the gel **electrolyte**. The volume ratio of the 2nd **polymer** to the 1st **polymer** is in the range of 0.1-5.

CN 2-Propenenitrile, homopolymer (9CI) (CA INDEX NAME)

CM 1

CRN 10 1

CMF C3 N



IT 1344-28-1, Alumina, uses and miscellaneous

RL: USES (Uses)

( $\gamma$ -, electrolytes containing, lithium

perchlorate-polyacrylonitrile, for secondary batteries)

RN 1344-28-1 CAPLUS

CN Aluminum oxide (Al<sub>2</sub>O<sub>3</sub>) (8CI, 9CI) (CA INDEX NAME)

\*\*\* STRUCTURE DIAGRAM IS NOT AVAILABLE \*\*\*

IC ICM H01M010-26

ICS H01M010-40; H01M006-18

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
Section cross-reference(s): 38

ST battery polyacrylonitrile alkali salt electrolyte

IT Batteries, secondary

(magnesium/manganese dioxide-molybdenum and lithium/titanium  
disulfide-molybdenum, with lithium perchlorate-  
polyacrylonitrile electrolytes)

IT 7791-03-9, Lithium perchlorate

RL: USES (Uses)

(electrolytes containing polyacrylonitrile and, for secondary  
batteries)

IT 7439-93-2D, Lithium, complexes with polyacrylonitrile

25014-41-9D, Polyacrylonitrile, lithium complexes

RL: USES (Uses)

(electrolytes, for secondary batteries)

IT 1344-28-1, Alumina, uses and miscellaneous

RL: USES (Uses)

( $\gamma$ -, electrolytes containing, lithium

perchlorate-polyacrylonitrile, for secondary batteries)

=>

**Lithium aluminate**

RL: MOA (Modifier or additive use); USES (Uses)  
 (fillers; acrylonitrile-Me methacrylate copolymer and **lithium**  
 salt aprotic solvent solution as solid **electrolyte** for secondary  
**batteries**)

L23 ANSWER 35 OF 35 CAPLUS COPYRIGHT 2004 ACS on STN

ACCESSION NUMBER: 1990:462636 CAPLUS

DOCUMENT NUMBER: 113:62636

TITLE: Secondary **batteries** with solid  
**polymer electrolytes**

INVENTOR(S): Jiang, Zhe; Yu, Mengqi; Zhu, Wencun; Tian, Qingyuan

PATENT ASSIGNEE(S): Tianjin Normal Training School, Peop. Rep. China

SOURCE: Faming Zhuanli Shenqing Gongkai Shuomingshu, 10 pp.  
 CODEN: CNXXEV

DOCUMENT TYPE: Patent

LANGUAGE: Chinese

FAMILY ACC. NUM. COUNT: 1

**PATENT INFORMATION:**

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
CN 1030671	A	19890125	CN 1987-104786	19870711

PRIORITY APPLN. INFO.: CN 1987-104786 19870711

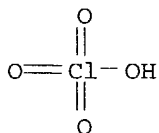
AB A thin polyacrylonitrile-alkali metal salt complex film is used as **electrolyte** for **batteries**. Preferably, the mixing mol ratio of polyacrylonitrile:salt is (2-6):1 and the salt is selected from NaI, NaSCN, LiI, LiClO<sub>4</sub>, and CF<sub>3</sub>SO<sub>3</sub>Li. The **batteries** have a light metal (Li or its alloy, Al, Mg, and Zn) anode and a cathode of a metal ion-insertable material such as TiS<sub>2</sub>, MnO<sub>2</sub>, V<sub>6</sub>O<sub>13</sub>, Mo, and/or C.

IT 7791-03-9, **Lithium** perchlorate

RL: USES (Uses)  
 (electrolytes containing polyacrylonitrile and, for secondary  
**batteries**)

RN 7791-03-9 CAPLUS

CN Perchloric acid, lithium salt (8CI, 9CI) (CA INDEX NAME)



● Li

IT 25014-41-9D, Polyacrylonitrile, **lithium** complexes

RL: USES (Uses)

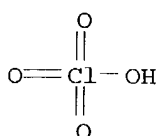
(electrolytes, for secondary **batteries**)

RN 25014-41-9 CAPLUS

IT 1344-28-1, Alumina, uses 7791-03-9, Lithium perchlorate 24980-62-9, Acrylonitrile vinyl acetate copolymer 25014-41-9, Polyacrylonitrile 25053-12-7, Acrylonitrile ethylacrylate copolymer  
 RL: DEV (Device component use); USES (Uses)  
 (gel electrolytic precursor and manufacturing of non-aqueous secondary battery)  
 RN 1344-28-1 CAPLUS  
 CN Aluminum oxide (Al2O3) (8CI, 9CI) (CA INDEX NAME)

\*\*\* STRUCTURE DIAGRAM IS NOT AVAILABLE \*\*\*

RN 7791-03-9 CAPLUS  
 CN Perchloric acid, lithium salt (8CI, 9CI) (CA INDEX NAME)

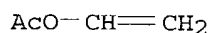


● Li

RN 24980-62-9 CAPLUS  
 CN Acetic acid ethenyl ester, polymer with 2-propenenitrile (9CI) (CA INDEX NAME)

CM 1

CRN 108-05-4  
 CMF C4 H6 O2



CM 2

CRN 107-13-1  
 CMF C3 H3 N



RN 25014-41-9 CAPLUS  
 CN 2-Propenenitrile, homopolymer (9CI) (CA INDEX NAME)

CM 1



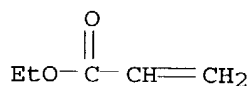
CRN 107-13-1  
CMF C3 H3 N



RN 25053-12-7 CAPLUS  
CN 2-Propenoic acid, ethyl ester, polymer with 2-propenenitrile (9CI) (CA  
INDEX NAME)

CM 1

CRN 140-88-5  
CMF C5 H8 O2



CM 2

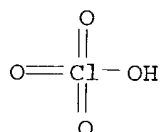
CRN 107-13-1  
CMF C3 H3 N



IC ICM H01M010-40  
ICS C08J009-28; C08L101-00  
CC 52-1 (Electrochemical, Radiational, and Thermal Energy Technology)  
Section cross-reference(s): 72  
ST gel **electrolytic** precursor nonaq secondary **battery**  
IT Secondary **batteries**  
(gel **electrolytic** precursor and manufacturing of non-aqueous secondary  
**battery**)  
IT Carbon black, uses  
Carbon fibers, uses  
Fluoropolymers, uses  
Phenolic resins, uses  
**Polymers**, uses  
Polyoxyalkylenes, uses  
RL: DEV (Device component use); USES (Uses)  
(gel **electrolytic** precursor and manufacturing of non-aqueous secondary  
**battery**)  
IT 68-12-2, Dmf, uses 872-50-4, N-Methyl-2-pyrrolidone, uses 1313-13-9,  
Manganese dioxide, uses 1314-62-1, Vanadium oxide, uses 1317-33-5,

solution to a barrel of an electrospinning machine; and, (c) electropinning the **polymeric electrolyte** solution onto a substrate using a nozzle to form a **polymer electrolyte** film. The **lithium secondary battery** of the present invention has advantages of better adhesion with electrodes, good mech. strength, better performance at low and high temps., and better compatibility with organic **electrolytes** of a **lithium secondary battery**.

IT 7791-03-9, **Lithium perchlorate** 9010-76-8,  
 Acrylonitrile-vinylidene chloride copolymer 24968-79-4,  
 Acrylonitrile-methylacrylate copolymer 25014-41-9,  
 Polyacrylonitrile  
 RL: DEV (Device component use); USES (Uses)  
 (fabrication of **lithium secondary battery**  
 comprising superfine fibrous **polymer electrolyte**)  
 RN 7791-03-9 CAPLUS  
 CN Perchloric acid, lithium salt (8CI, 9CI) (CA INDEX NAME)

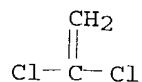


● Li

RN 9010-76-8 CAPLUS  
 CN 2-Propenenitrile, polymer with 1,1-dichloroethene (9CI) (CA INDEX NAME)  
 CM 1  
 CRN 107-13-1  
 CMF C3 H3 N



CM 2  
 CRN 75-35-4  
 CMF C2 H2 Cl2

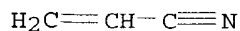


RN 24968-79-4 CAPLUS  
CN 2-Propenoic acid, methyl ester, polymer with 2-propenenitrile (9CI) (CA INDEX NAME)

CM 1

CRN 107-13-1

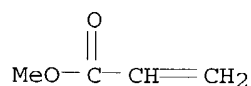
CMF C3 H3 N



CM 2

CRN 96-33-3

CMF C4 H6 O2

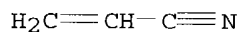


RN 25014-41-9 CAPLUS  
CN 2-Propenenitrile, homopolymer (9CI) (CA INDEX NAME)

CM 1

CRN 107-13-1

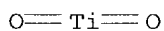
CMF C3 H3 N



IT 13463-67-7, Titania, uses  
RL: DEV (Device component use); USES (Uses)  
(filling agent; fabrication of **lithium** secondary  
**battery** comprising superfine fibrous **polymer**  
**electrolyte**)

RN 13463-67-7 CAPLUS

CN Titanium oxide (TiO2) (8CI, 9CI) (CA INDEX NAME)



IT 1344-28-1, Alumina, uses  
RL: MOA (Modifier or additive use); USES (Uses)  
(filling agent; fabrication of **lithium** secondary

**battery comprising superfine fibrous polymer electrolyte)**

RN 1344-28-1 CAPLUS

CN Aluminum oxide (Al<sub>2</sub>O<sub>3</sub>) (8CI, 9CI) (CA INDEX NAME)

\*\*\* STRUCTURE DIAGRAM IS NOT AVAILABLE \*\*\*

IC ICM H01M010-40

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
Section cross-reference(s): 38

ST **lithium secondary battery** superfine fibrous  
**polymer electrolyte**

IT **Battery electrolytes**  
Plasticizers

**Polymer electrolytes**

(fabrication of **lithium secondary battery**  
comprising superfine fibrous **polymer electrolyte**)

IT Fluoropolymers, uses  
Polyoxyalkylenes, uses

RL: DEV (Device component use); USES (Uses)  
(fabrication of **lithium secondary battery**  
comprising superfine fibrous **polymer electrolyte**)

IT Fluoropolymers, uses  
RL: MOA (Modifier or additive use); USES (Uses)  
(filling agent; fabrication of **lithium secondary battery** comprising superfine fibrous **polymer electrolyte**)

IT Secondary **batteries**  
(**lithium**; fabrication of **lithium secondary battery** comprising superfine fibrous **polymer electrolyte**)

IT Alcohols, uses  
RL: MOA (Modifier or additive use); USES (Uses)  
(plasticizer; fabrication of **lithium secondary battery** comprising superfine fibrous **polymer electrolyte**)

IT Fibers  
RL: DEV (Device component use); USES (Uses)  
(spinning, electrospinning; fabrication of **lithium secondary battery** comprising superfine fibrous **polymer electrolyte**)

IT 79-20-9, Methyl acetate 105-37-3, Ethyl propionate 109-99-9, Thf, uses  
141-78-6, Ethyl acetate, uses 554-12-1, Methyl propionate  
7791-03-9, **Lithium perchlorate** 9002-86-2, Pvc  
9002-88-4, Polyethylene 9003-07-0, Polypropylene 9003-20-7, Polyvinyl  
acetate 9004-34-6, Cellulose, uses 9004-35-7, Cellulose acetate  
9004-36-8 9004-39-1, Cellulose acetate propionate 9010-76-8,  
Acrylonitrile-vinylidene chloride copolymer 9010-88-2, Ethyl  
acrylate-methyl methacrylate copolymer 9011-14-7, Pmma 9011-17-0,  
Hexafluoropropylene-vinylidene fluoride copolymer 12190-79-3, Cobalt  
**lithium oxide colio2** 14283-07-9, **Lithium**  
tetrafluoroborate 21324-40-3, **Lithium hexafluorophosphate**  
24936-67-2, Polyethylenesulfide 24937-79-9, PvdF 24968-79-4,

Acrylonitrile-methylacrylate copolymer 25014-41-9,  
Polyacrylonitrile 25086-89-9, Vinyl acetate-vinylpyrrolidone copolymer  
25266-14-2, Oxyethylene-oxyethylene copolymer 25322-68-3, Peo  
25322-69-4, Polypropylene oxide 25569-53-3, Polyethylenesuccinate  
26913-06-4, Poly[imino(1,2-ethanediyl)] 29935-35-1, **Lithium**  
hexafluoroarsenate 33454-82-9, **Lithium** triflate 98973-15-0,  
Poly[bis(2-(2-methoxyethoxyethoxy)phosphazene)]  
RL: DEV (Device component use); USES (Uses)

(fabrication of **lithium** secondary **battery**  
comprising superfine fibrous **polymer electrolyte**)

IT 7631-86-9, Silica, uses 26101-52-0

RL: MOA (Modifier or additive use); USES (Uses)

(fabrication of **lithium** secondary **battery**  
comprising superfine fibrous **polymer electrolyte**)

IT 13463-67-7, Titania, uses

RL: DEV (Device component use); USES (Uses)

(filling agent; fabrication of **lithium** secondary  
**battery** comprising superfine fibrous **polymer**  
**electrolyte**)

IT 554-13-2, **Lithium** carbonate 1304-28-5, Barium oxide bao, uses

1309-48-4, Magnesia, uses 1310-65-2, **Lithium** hydroxide

1313-59-3, Sodium oxide, uses 1344-28-1, Alumina, uses

7789-24-4, **Lithium** fluoride, uses 9002-84-0, Ptfе

12003-67-7, Aluminum **lithium** oxide allio2 12047-27-7, Barium

titanium oxide batio3, uses 12057-24-8, Lithia, uses 26134-62-3,

**Lithium** nitride

RL: MOA (Modifier or additive use); USES (Uses)

(filling agent; fabrication of **lithium** secondary  
**battery** comprising superfine fibrous **polymer**  
**electrolyte**)

IT 67-64-1, Acetone, uses 67-68-5, Dmsо, uses 68-12-2, Dmf, uses

80-73-9, 1,3-Dimethyl-2-imidazolidinone 96-48-0, Butyrolactone

96-49-1, Ethylene carbonate 105-58-8, Diethyl carbonate 108-32-7,

Propylene carbonate 110-71-4, 1,2-Dimethoxyethane 127-19-5,

n,n-Dimethyl acetamide 143-24-8, Tetraethylene glycol dimethyl ether

616-38-6, Dimethyl carbonate 623-53-0, Ethyl methyl carbonate

872-50-4, N-Methyl-2-pyrrolidone, uses 4437-85-8, Butylene carbonate

RL: MOA (Modifier or additive use); USES (Uses)

(plasticizer; fabrication of **lithium** secondary  
**battery** comprising superfine fibrous **polymer**  
**electrolyte**)

REFERENCE COUNT: 8 THERE ARE 8 CITED REFERENCES AVAILABLE FOR THIS  
RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L23 ANSWER 23 OF 35 CAPLUS COPYRIGHT 2004 ACS on STN

ACCESSION NUMBER: 2001:851556 CAPLUS

DOCUMENT NUMBER: 135:374195

TITLE: Fabrication of a **lithium** secondary  
**battery** comprising a superfine fibrous  
**polymer** separator film

INVENTOR(S): Yun, Kyung Suk; Cho, Byung Won; Jo, Seong Mu; Lee, Wha  
Seop; Cho, Won Il; Park, Kun You; Kim, Hyung Sun; Kim,

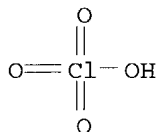
PATENT ASSIGNEE(S): Un Seok; Ko, Seok Ku; Chun, Suk Won; Choi, Sung Won  
 SOURCE: Korea Institute of Science and Technology, S. Korea  
 PCT Int. Appl., 34 pp.  
 CODEN: PIXXD2  
 DOCUMENT TYPE: Patent  
 LANGUAGE: English  
 FAMILY ACC. NUM. COUNT: 1  
 PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 2001089022	A1	20011122	WO 2000-KR500	20000519
W: JP, KR, US				
JP 2003533862	T2	20031111	JP 2001-585344	20000519
PRIORITY APPLN. INFO.:			WO 2000-KR500	W 20000519

AB The present invention provides a **lithium** secondary **battery** and its fabrication method. More particularly, the present invention provides a **lithium** secondary **battery** comprising a super fine fibrous porous **polymer** separator film and its fabrication method, wherein the porous **polymer** separator film is fabricated by the following process: (a) melting at least one **polymer** or dissolving at least one **polymer** with organic solvents to obtain at least one **polymeric** melt or at least one **polymeric** solution; (b) adding the obtained **polymeric** melt or **polymeric** solution to barrels of an electrospinning machine; and (c) discharging the **polymeric** melt or **polymeric** solution onto a substrate using a nozzle to form a porous separator film. The **lithium** secondary **battery** of the present invention has the advantages of better adhesion with electrodes, good mech. strength, better performance at low and high temps., and better compatibility with organic **electrolyte** solution of a **lithium** secondary **battery**.

IT 7791-03-9, **Lithium** perchlorate 9010-76-8, Acrylonitrile-vinylidene chloride copolymer 25014-41-9, Polyacrylonitrile 25749-57-9, Acrylonitrile-methacrylic acid copolymer  
 RL: DEV (Device component use); USES (Uses)  
 (fabrication of **lithium** secondary **battery** comprising superfine fibrous **polymer** separator film)

RN 7791-03-9 CAPLUS  
 CN Perchloric acid, lithium salt (8CI, 9CI) (CA INDEX NAME)



● Li

RN 9010-76-8 CAPLUS  
CN 2-Propenenitrile, polymer with 1,1-dichloroethene (9CI) (CA INDEX NAME)

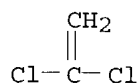
CM 1

CRN 107-13-1  
CMF C3 H3 N



CM 2

CRN 75-35-4  
CMF C2 H2 Cl2



RN 25014-41-9 CAPLUS  
CN 2-Propenenitrile, homopolymer (9CI) (CA INDEX NAME)

CM 1

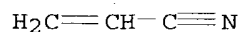
CRN 107-13-1  
CMF C3 H3 N



RN 25749-57-9 CAPLUS  
CN 2-Propenoic acid, 2-methyl-, polymer with 2-propenenitrile (9CI) (CA INDEX NAME)

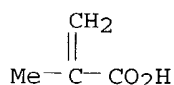
CM 1

CRN 107-13-1  
CMF C3 H3 N



CM 2

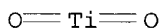
CRN 79-41-4  
CMF C4 H6 O2



IT 1344-28-1, Alumina, uses  
RL: MOA (Modifier or additive use); USES (Uses)  
(fabrication of **lithium** secondary **battery**  
comprising superfine fibrous **polymer** separator film)  
RN 1344-28-1 CAPLUS  
CN Aluminum oxide (Al2O3) (8CI, 9CI) (CA INDEX NAME)

\*\*\* STRUCTURE DIAGRAM IS NOT AVAILABLE \*\*\*

IT 13463-67-7, Titania, uses  
RL: MOA (Modifier or additive use); USES (Uses)  
(filling agent; fabrication of **lithium** secondary  
**battery** comprising superfine fibrous **polymer**  
separator film)  
RN 13463-67-7 CAPLUS  
CN Titanium oxide (TiO2) (8CI, 9CI) (CA INDEX NAME)



IC ICM H01M010-40  
CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
Section cross-reference(s): 38  
ST **lithium** secondary **battery** superfine fibrous  
**polymer** separator  
IT Secondary **battery** separators  
(fabrication of **lithium** secondary **battery**  
comprising superfine fibrous **polymer** separator film)  
IT Alcohols, uses  
Polyoxyalkylenes, uses  
RL: DEV (Device component use); USES (Uses)  
(fabrication of **lithium** secondary **battery**  
comprising superfine fibrous **polymer** separator film)  
IT Fluoropolymers, uses  
RL: MOA (Modifier or additive use); USES (Uses)  
(fabrication of **lithium** secondary **battery**  
comprising superfine fibrous **polymer** separator film)  
IT Secondary **batteries**  
(**lithium**; fabrication of **lithium** secondary  
**battery** comprising superfine fibrous **polymer**  
separator film)  
IT Fibers



RL: DEV (Device component use); USES (Uses)  
(spinning, electro-; fabrication of **lithium** secondary  
**battery** comprising superfine fibrous **polymer**  
separator film)

IT 67-64-1, Acetone, uses 67-68-5, DmsO, uses 68-12-2, Dmf, uses  
79-20-9, Methyl acetate 80-73-9, 1,3-Dimethyl-2-imidazolidinone  
96-48-0, Butyrolactone 96-49-1, Ethylene carbonate 105-37-3, Ethyl  
propionate 105-58-8, Diethyl carbonate 108-32-7, Propylene carbonate  
109-99-9, Thf, uses 110-71-4, 1,2-Dimethoxyethane 127-19-5, Dimethyl  
acetamide 141-78-6, Ethyl acetate, uses 143-24-8, Tetraethyleneglycol  
dimethyl ether 554-12-1, Methyl propionate 616-38-6, Dimethyl  
carbonate 623-53-0, Ethylmethyl carbonate 872-50-4,  
n-Methyl-2-pyrrolidone, uses 4437-85-8, Butylene carbonate 7782-42-5,  
Graphite, uses 7791-03-9, **Lithium** perchlorate  
9002-86-2, Pvc 9002-88-4, Polyethylene 9003-07-0, Polypropylene  
9003-20-7, Polyvinyl acetate 9004-34-6, Cellulose, uses 9004-35-7,  
Cellulose acetate 9004-36-8 9004-39-1, Cellulose acetate propionate  
**9010-76-8**, Acrylonitrile-vinylidene chloride copolymer  
9010-88-2, Ethyl acrylate-methyl methacrylate copolymer 9011-14-7, Pmma  
9011-17-0, Hexafluoropropylene-vinylidene fluoride copolymer 12190-79-3,  
Cobalt **lithium** oxide colio2 14283-07-9, **Lithium**  
tetrafluoroborate 21324-40-3, **Lithium** hexafluorophosphate  
24936-67-2, Polyethylenesulfide 24937-79-9, PvdF **25014-41-9**,  
Polyacrylonitrile 25086-89-9, Vinyl acetate-vinyl pyrrolidone copolymer  
25266-14-2 25322-68-3, Peo 25322-69-4, Polypropylene oxide  
25569-53-3, Polyethylenesuccinate **25749-57-9**,  
Acrylonitrile-methacrylic acid copolymer 26101-52-0 26913-06-4,  
Poly[imino(1,2-ethanediyl)] 29935-35-1, **Lithium**  
hexafluoroarsenate 33454-82-9, **Lithium** triflate 98973-15-0

RL: DEV (Device component use); USES (Uses)  
(fabrication of **lithium** secondary **battery**  
comprising superfine fibrous **polymer** separator film)

IT 554-13-2, **Lithium** carbonate 1344-28-1, Alumina, uses  
9002-84-0, PtfE

RL: MOA (Modifier or additive use); USES (Uses)  
(fabrication of **lithium** secondary **battery**  
comprising superfine fibrous **polymer** separator film)

IT 1304-28-5, Barium monoxide, uses 1309-48-4, Magnesia, uses 1310-65-2,  
**Lithium** hydroxide 1313-59-3, Sodium oxide na2O, uses  
7631-86-9, Silica, uses 7789-24-4, **Lithium** fluoride, uses  
12003-67-7, Aluminum **lithium** oxide alio2 12047-27-7, Barium  
titanium oxide batio3, uses 12057-24-8, Lithia, uses **13463-67-7**  
, Titania, uses 26134-62-3, **Lithium** nitride

RL: MOA (Modifier or additive use); USES (Uses)  
(filling agent; fabrication of **lithium** secondary  
**battery** comprising superfine fibrous **polymer**  
separator film)

REFERENCE COUNT: 8 THERE ARE 8 CITED REFERENCES AVAILABLE FOR THIS  
RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L23 ANSWER 24 OF 35 CAPLUS COPYRIGHT 2004 ACS on STN  
ACCESSION NUMBER: 2001:851555 CAPLUS

DOCUMENT NUMBER: 135:374194  
 TITLE: Fabrication of **composite polymer electrolyte** and a **lithium secondary battery** comprising the **composite polymer electrolyte**  
 INVENTOR(S): Yun, Kyung Suk; Cho, Byung Won; Jo, Seong Mu; Lee, Wha Seop; Cho, Won Il; Park, Kun You; Kim, Hyung Sun; Kim, Un Seok; Ko, Seok Ku; Choi, Sung Won  
 PATENT ASSIGNEE(S): Korea Institute of Science and Technology, S. Korea; Chun, Suk Won  
 SOURCE: PCT Int. Appl., 37 pp.  
 CODEN: PIXXD2  
 DOCUMENT TYPE: Patent  
 LANGUAGE: English  
 FAMILY ACC. NUM. COUNT: 1  
 PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 2001089021	A1	20011122	WO 2000-KR499	20000519
W: JP, KR, US				

PRIORITY APPLN. INFO.: WO 2000-KR499 20000519

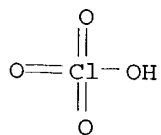
AB The present invention provides a novel **composite polymer electrolyte, lithium secondary battery** comprising the **composite polymer electrolyte** and their fabrication methods. More particularly, the present invention provides the **composite polymer electrolyte** comprising super fine fibrous porous **polymer electrolyte** matrix with particles having diameter of 1-3000 nm, **polymers** and **lithium** salt-dissolved organic **electrolyte** solns. incorporated into the porous **polymer electrolyte** matrix. The **composite polymer electrolyte** of the present invention has advantages of better adhesion with electrodes, good mech. strength, better performance at low and high temps., better compatibility with organic **electrolytes** of **lithium** secondary **battery** and it can be applied to the manufacture of **lithium** secondary **batteries**.

IT 7791-03-9, **Lithium perchlorate 9010-76-8**, Acrylonitrile-vinylidene chloride copolymer 25014-41-9, Polyacrylonitrile 25749-57-9, Acrylonitrile-methacrylic acid copolymer

RL: DEV (Device component use); USES (Uses)  
 (fabrication of **composite polymer electrolyte** and **lithium secondary battery** comprising **composite polymer electrolyte**)

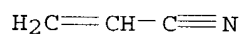
RN 7791-03-9 CAPLUS

CN Perchloric acid, lithium salt (8CI, 9CI) (CA INDEX NAME)

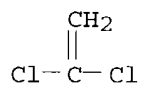


● Li

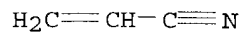
RN 9010-76-8 CAPLUS  
 CN 2-Propenenitrile, polymer with 1,1-dichloroethene (9CI) (CA INDEX NAME)  
 CM 1  
 CRN 107-13-1  
 CMF C3 H3 N



CM 2  
 CRN 75-35-4  
 CMF C2 H2 Cl2

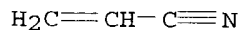


RN 25014-41-9 CAPLUS  
 CN 2-Propenenitrile, homopolymer (9CI) (CA INDEX NAME)  
 CM 1  
 CRN 107-13-1  
 CMF C3 H3 N



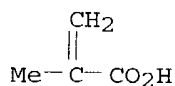
RN 25749-57-9 CAPLUS  
 CN 2-Propenoic acid, 2-methyl-, polymer with 2-propenenitrile (9CI) (CA INDEX NAME)  
 CM 1

CRN 107-13-1  
CMF C3 H3 N



CM 2

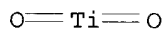
CRN 79-41-4  
CMF C4 H6 O2



IT 1344-28-1, Alumina, uses 13463-67-7, Titania, uses  
RL: MOA (Modifier or additive use); USES (Uses)  
(filling agent; fabrication of **composite polymer  
electrolyte and lithium secondary battery  
comprising composite polymer electrolyte**)  
RN 1344-28-1 CAPLUS  
CN Aluminum oxide (Al2O3) (8CI, 9CI) (CA INDEX NAME)

\*\*\* STRUCTURE DIAGRAM IS NOT AVAILABLE \*\*\*

RN 13463-67-7 CAPLUS  
CN Titanium oxide (TiO2) (8CI, 9CI) (CA INDEX NAME)



IC ICM H01M010-40  
CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
Section cross-reference(s): 38  
ST **lithium secondary battery composite  
polymer electrolyte**  
IT **Battery electrolytes**  
Plasticizers  
**Polymer electrolytes**  
(fabrication of **composite polymer  
electrolyte and lithium secondary battery  
comprising composite polymer electrolyte**)  
IT Fluoropolymers, uses  
Polyoxyalkylenes, uses  
RL: DEV (Device component use); USES (Uses)  
(fabrication of **composite polymer  
electrolyte and lithium secondary battery**)

- comprising **composite polymer electrolyte**)
- IT Fluoropolymers, uses  
 RL: MOA (Modifier or additive use); USES (Uses)  
 (filling agent; fabrication of **composite polymer electrolyte** and **lithium secondary battery** comprising **composite polymer electrolyte**)
- IT Secondary batteries  
 (lithium; fabrication of **composite polymer electrolyte** and **lithium secondary battery** comprising **composite polymer electrolyte**)
- IT Alcohols, uses  
 RL: MOA (Modifier or additive use); USES (Uses)  
 (plasticizer; fabrication of **composite polymer electrolyte** and **lithium secondary battery** comprising **composite polymer electrolyte**)
- IT Fibers  
 RL: DEV (Device component use); USES (Uses)  
 (spinning, electro-; fabrication of **composite polymer electrolyte** and **lithium secondary battery** comprising **composite polymer electrolyte**)
- IT 96-49-1, Ethylene carbonate 105-58-8, Diethyl carbonate 108-32-7, Propylene carbonate 616-38-6, Dimethyl carbonate 623-53-0, Ethyl methyl carbonate 7782-42-5, Graphite, uses 7791-03-9, **Lithium** perchlorate 9002-86-2, Pvc 9002-88-4, Polyethylene 9003-07-0, Polypropylene 9003-20-7, Polyvinyl acetate 9004-34-6, Cellulose, uses 9004-35-7, Cellulose acetate 9004-36-8 9004-39-1, Cellulose acetate propionate 9010-76-8, Acrylonitrile-vinylidene chloride copolymer 9010-88-2, Ethyl acrylate-methyl methacrylate copolymer 9011-14-7, Pmma 9011-17-0, Hexafluoropropylene-vinylidene fluoride copolymer 12190-79-3, Cobalt **lithium** oxide colio2 14283-07-9, **Lithium** tetrafluoroborate 21324-40-3, **Lithium** hexafluorophosphate 24936-67-2, Polyethylene sulfide 24937-79-9, PvdF 25014-41-9, Polyacrylonitrile 25086-89-9, Vinyl acetate-vinylpyrrolidone copolymer 25266-14-2 25322-68-3, Peo 25322-69-4, Polypropylene oxide 25569-53-3, Polyethylene succinate 25721-76-0, Polyethylene glycol dimethacrylate 25749-57-9, Acrylonitrile-methacrylic acid copolymer 26570-48-9, Polyethylene glycol diacrylate 26913-06-4, Poly[imino(1,2-ethanediyl)] 29935-35-1, **Lithium** hexafluoroarsenate 33454-82-9, **Lithium** triflate 98973-15-0  
 RL: DEV (Device component use); USES (Uses)  
 (fabrication of **composite polymer electrolyte** and **lithium secondary battery** comprising **composite polymer electrolyte**)
- IT 79-20-9, Methyl acetate 96-48-0,  $\gamma$ -Butyrolactone 105-37-3, Ethyl propionate 109-99-9, Thf, uses 110-71-4, 1,2-Dimethoxyethane 127-19-5, Dimethyl acetamide 141-78-6, Ethyl acetate, uses 554-12-1, Methyl propionate 4437-85-8, Butylene carbonate 12003-67-7, Aluminum **lithium** oxide alio2  
 RL: MOA (Modifier or additive use); USES (Uses)  
 (fabrication of **composite polymer electrolyte** and **lithium secondary battery**)

comprising **composite polymer electrolyte**)

IT 554-13-2, **Lithium** carbonate 1304-28-5, Baria, uses  
 1309-48-4, Magnesia, uses 1310-65-2, **Lithium** hydroxide  
 1313-59-3, Sodium oxide, uses 1344-28-1, Alumina, uses  
 7631-86-9, Silica, uses 7789-24-4, **Lithium** fluoride, uses  
 9002-84-0, Ptfе 12047-27-7, Barium titanium oxide batіo3, uses  
 12057-24-8, Lithia, uses 13463-67-7, Titania, uses 26134-62-3,  
**Lithium** nitride li3n

RL: MOA (Modifier or additive use); USES (Uses)  
 (filling agent; fabrication of **composite polymer  
 electrolyte and lithium secondary battery  
 comprising composite polymer electrolyte**)

IT 67-64-1, Acetone, uses 67-68-5, Dmsо, uses 68-12-2, Dmf, uses  
 80-73-9, 1,3-Dimethyl-2-imidazolidinone 143-24-8, Tetraethylene glycol  
 dimethyl ether 872-50-4, n-Methyl-2-pyrrolidone, uses 26101-52-0

RL: MOA (Modifier or additive use); USES (Uses)  
 (plasticizer; fabrication of **composite polymer  
 electrolyte and lithium secondary battery  
 comprising composite polymer electrolyte**)

REFERENCE COUNT: 8 THERE ARE 8 CITED REFERENCES AVAILABLE FOR THIS  
 RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L23 ANSWER 25 OF 35 CAPLUS COPYRIGHT 2004 ACS on STN

ACCESSION NUMBER: 2001:851554 CAPLUS

DOCUMENT NUMBER: 135:374193

TITLE: Fabrication method of **lithium secondary  
 battery with hybrid polymer  
 electrolyte**

INVENTOR(S): Yun, Kyung Suk; Cho, Byung Won; Jo, Seong Mu; Lee, Wha  
 Seop; Cho, Won Il; Park, Kun You; Kim, Hyung Sun; Kim,  
 Un Seok; Ko, Seok Ku; Chun, Suk Won; Choi, Sung Won

PATENT ASSIGNEE(S): Korea Institute of Science and Technology, S. Korea

SOURCE: PCT Int. Appl., 41 pp.  
 CODEN: PIXXD2

DOCUMENT TYPE: Patent

LANGUAGE: English

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 2001089020	A1	20011122	WO 2000-KR498	20000519
W: JP, KR, US				
JP 2003533861	T2	20031111	JP 2001-585342	20000519
PRIORITY APPLN. INFO.:			WO 2000-KR498	W 20000519

AB The present invention provides a novel hybrid **polymer  
 electrolyte, a lithium secondary battery  
 comprising the hybrid polymer electrolyte  
 polymer** and their fabrication methods. More particularly, the  
 present invention provides the hybrid **polymer  
 electrolyte** comprising superfine fibrous porous **polymer**  
 matrix with particles having diameter of 1-3000 nm, **polymers** and

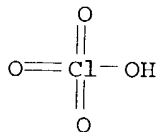
**lithium** salt-dissolved organic **electrolyte** solns. incorporated into the porous **polymer** matrix. The hybrid **polymer electrolyte** has advantages of better adhesion with electrodes, good mech. strength, better performance at low and high temps., better compatibility with organic **electrolytes** of a **lithium** secondary **battery** and it can be applied to the manufacture of **lithium** secondary **batteries**.

IT 7791-03-9, **Lithium** perchlorate 9010-76-8,  
Acrylonitrile-vinylidene chloride copolymer 25014-41-9,  
Polyacrylonitrile 25749-57-9, Acrylonitrile-methacrylic acid  
copolymer

RL: DEV (Device component use); USES (Uses)  
(fabrication method of **lithium** secondary **battery**  
with hybrid **polymer electrolyte**)

RN 7791-03-9 CAPLUS

CN Perchloric acid, lithium salt (8CI, 9CI) (CA INDEX NAME)



● Li

RN 9010-76-8 CAPLUS

CN 2-Propenenitrile, polymer with 1,1-dichloroethene (9CI) (CA INDEX NAME)

CM 1

CRN 107-13-1

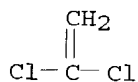
CMF C3 H3 N



CM 2

CRN 75-35-4

CMF C2 H2 Cl2



RN 25014-41-9 CAPLUS  
CN 2-Propenenitrile, homopolymer (9CI) (CA INDEX NAME)

CM 1

CRN 107-13-1  
CMF C3 H3 N



RN 25749-57-9 CAPLUS  
CN 2-Propenoic acid, 2-methyl-, polymer with 2-propenenitrile (9CI) (CA INDEX NAME)

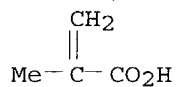
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CRN 107-13-1  
CMF C3 H3 N



CM 2

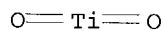
CRN 79-41-4  
CMF C4 H6 O2



IT 1344-28-1, Alumina, uses 13463-67-7, Titania, uses  
RL: MOA (Modifier or additive use); USES (Uses)  
(filling agent; fabrication method of **lithium** secondary  
**battery** with hybrid **polymer electrolyte**)  
RN 1344-28-1 CAPLUS  
CN Aluminum oxide (Al2O3) (8CI, 9CI) (CA INDEX NAME)

\*\*\* STRUCTURE DIAGRAM IS NOT AVAILABLE \*\*\*

RN 13463-67-7 CAPLUS  
CN Titanium oxide (TiO2) (8CI, 9CI) (CA INDEX NAME)





IC ICM H01M010-40  
 CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
 Section cross-reference(s): 38  
 ST **lithium secondary battery hybrid polymer electrolyte**  
 IT **Battery electrolytes**  
 Plasticizers  
**Polymer electrolytes**  
 (fabrication method of **lithium secondary battery with hybrid polymer electrolyte**)  
 IT Fluoropolymers, uses  
 Polyoxyalkylenes, uses  
 RL: DEV (Device component use); USES (Uses)  
 (fabrication method of **lithium secondary battery with hybrid polymer electrolyte**)  
 IT Fluoropolymers, uses  
 RL: MOA (Modifier or additive use); USES (Uses)  
 (filling agent; fabrication method of **lithium secondary battery with hybrid polymer electrolyte**)  
 IT **Secondary batteries**  
 (**lithium**; fabrication method of **lithium secondary battery with hybrid polymer electrolyte**)  
 IT Alcohols, uses  
 RL: MOA (Modifier or additive use); USES (Uses)  
 (plasticizer; fabrication method of **lithium secondary battery with hybrid polymer electrolyte**)  
 IT Fibers  
 RL: DEV (Device component use); USES (Uses)  
 (spinning, electro-; fabrication method of **lithium secondary battery with hybrid polymer electrolyte**)  
 IT 79-20-9, Methyl acetate 96-48-0,  $\gamma$ -Butyrolactone 96-49-1, Ethylene carbonate 105-58-8, Diethyl carbonate 108-32-7, Propylene carbonate 109-99-9, Thf, uses 110-71-4, 1,2-Dimethoxyethane 127-19-5, Dimethyl acetamide 141-78-6, Ethyl acetate, uses 554-12-1, Methyl propionate 616-38-6, Dimethyl carbonate 623-53-0, Ethylmethyl carbonate 4437-85-8, Butylene carbonate 7782-42-5, Graphite, uses 7791-03-9, **Lithium perchlorate** 9002-86-2, Pvc 9002-88-4, Polyethylene 9003-07-0, Polypropylene 9003-20-7, Polyvinyl acetate 9004-34-6, Cellulose, uses 9004-35-7, Cellulose acetate 9004-36-8 9004-39-1, Cellulose acetate propionate **9010-76-8**, Acrylonitrile-vinylidene chloride copolymer 9010-88-2, Ethyl acrylate-methyl methacrylate copolymer 9011-14-7, Pmma 9011-17-0, Hexafluoropropylene-vinylidene fluoride copolymer 12190-79-3, Cobalt **lithium oxide colio2** 14283-07-9, **Lithium tetrafluoroborate** 21324-40-3, **Lithium hexafluorophosphate** 24937-79-9, PvdF 24980-34-5, Polyethylene sulfide **25014-41-9**, Polyacrylonitrile 25086-89-9 25266-14-2, Oxyethylene-oxyethylene copolymer 25322-68-3, Peo 25322-69-4, Polypropylene oxide 25569-53-3, Polyethylene succinate 25721-76-0, Polyethylene glycol dimethacrylate **25749-57-9**, Acrylonitrile-methacrylic acid copolymer 26570-48-9, Polyethylene glycol diacrylate 26913-06-4, Poly[imino(1,2-ethanediyl)] 29935-35-1, **Lithium**

hexafluoroarsenate 33454-82-9, **Lithium** triflate 98973-15-0

RL: DEV (Device component use); USES (Uses)

(fabrication method of **lithium** secondary **battery**  
with hybrid **polymer electrolyte**)

IT 554-13-2, **Lithium** carbonate 1304-28-5, Baria, uses  
1309-48-4, Magnesia, uses 1310-65-2, **Lithium** hydroxide  
1313-59-3, Sodiumoxide, uses **1344-28-1**, Alumina, uses  
7631-86-9, Silica, uses 7789-24-4, **Lithium** fluoride, uses  
9002-84-0, Ptfе 12003-67-7, Aluminum **lithium** oxide allio2  
12047-27-7, Barium titanium oxide batio3, uses 12057-24-8, Lithia, uses  
**13463-67-7**, Titania, uses 26134-62-3, **Lithium** nitride  
li3n

RL: MOA (Modifier or additive use); USES (Uses)

(filling agent; fabrication method of **lithium** secondary  
**battery** with hybrid **polymer electrolyte**)

IT 67-64-1, Acetone, uses 67-68-5, Dmsо, uses 68-12-2, Dmf, uses  
80-73-9, 1,3-Dimethyl-2-imidazolidinone 143-24-8, Tetraethylene glycol  
dimethyl ether 872-50-4, n-Methyl-2-pyrrolidone, uses 26101-52-0

RL: MOA (Modifier or additive use); USES (Uses)

(plasticizer; fabrication method of **lithium** secondary  
**battery** with hybrid **polymer electrolyte**)

REFERENCE COUNT: 8 THERE ARE 8 CITED REFERENCES AVAILABLE FOR THIS  
RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L23 ANSWER 26 OF 35 CAPLUS COPYRIGHT 2004 ACS on STN

ACCESSION NUMBER: 2001:598427 CAPLUS

DOCUMENT NUMBER: 135:183257

TITLE: Method of producing ion conductive laminate for  
**electrolyte** application in  
**electrochemical** cells

INVENTOR(S): Takeuchi, Masataka; Naijo, Shuichi; Ohkubo, Takashi;  
Yotsuyanagi, Junji; Hirata, Motoyuki

PATENT ASSIGNEE(S): Japan

SOURCE: U.S. Pat. Appl. Publ., 46 pp., Cont.-in-part of U.S.  
Ser. No. 822,465, abandoned.

CODEN: USXXCO

DOCUMENT TYPE: Patent

LANGUAGE: English

FAMILY ACC. NUM. COUNT: 2

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
US 2001014420	A1	20010816	US 1997-946850	19971008
US 6306509	B2	20011023		
WO 9735351	A1	19970925	WO 1997-JP944	19970321

W: CA, CN, KR, SG, US

RW: AT, BE, CH, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE

PRIORITY APPLN. INFO.:

JP 1996-93682	A	19960321
US 1996-14567P	P	19960401
US 1997-822465	B2	19970321
WO 1997-JP944	A2	19970321

AB A laminate comprises an ion conductive material having excellent ion conductivity  
 at room temperature or at lower temps., a small water content, sufficiently high  
 mech. strength and storage stability to allow for handling the ion conductive material in practice, and a form which is easily integrated into an **electrochem.** element or **electrochem.** devices.  
 Also disclosed is a production method thereof, and a method of producing a **battery**, a capacitor or an **electrochem.** element or apparatus using the laminate. The laminate comprises an intermediate layer of an ion conductive material having on the upper and lower portions thereof outer layers having an ion conductivity lower than that of the intermediate layer. Furthermore, at least one of the outer layers is a layer comprising a non-electron-conductive material.

IT 25749-57-9DP, Acrylonitrile-methacrylic acid copolymer, **lithium** complexes  
 RL: DEV (Device component use); SPN (Synthetic preparation); PREP (Preparation); USES (Uses)  
 (method of producing ion conductive laminate for **electrolyte** application in **electrochem.** cells)

RN 25749-57-9 CAPLUS

CN 2-Propenoic acid, 2-methyl-, polymer with 2-propenenitrile (9CI) (CA INDEX NAME)

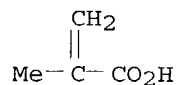
CM 1

CRN 107-13-1  
 CMF C3 H3 N



CM 2

CRN 79-41-4  
 CMF C4 H6 O2



IT 1344-28-1, Alumina, uses 7791-03-9, **Lithium** perchlorate  
 RL: DEV (Device component use); TEM (Technical or engineered material use); USES (Uses)  
 (method of producing ion conductive laminate for **electrolyte** application in **electrochem.** cells)

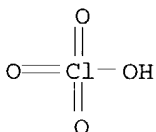
RN 1344-28-1 CAPLUS

CN Aluminum oxide (Al<sub>2</sub>O<sub>3</sub>) (8CI, 9CI) (CA INDEX NAME)

\*\*\* STRUCTURE DIAGRAM IS NOT AVAILABLE \*\*\*

RN 7791-03-9 CAPLUS

CN Perchloric acid, lithium salt (8CI, 9CI) (CA INDEX NAME)



● Li

IC B32B003-00; H01M010-26

NCL 429209000

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
Section cross-reference(s): 38, 72, 74, 76

ST **battery electrolyte** ion conductive laminate

IT Capacitors

(double layer; method of producing ion conductive laminate for  
**electrolyte** application in **electrochem.** cells)

IT Electroluminescent devices

(**electrochem.**; method of producing ion conductive laminate  
for **electrolyte** application in **electrochem.** cells)

IT Capacitors

(**electrolyte**; method of producing ion conductive laminate for  
**electrolyte** application in **electrochem.** cells)

IT Secondary **batteries**

(**lithium**; method of producing ion conductive laminate for  
**electrolyte** application in **electrochem.** cells)

IT **Battery electrolytes**

Electric resistance

Electrochromic devices

Electrochromic imaging devices

Ionic conductivity

Laminated materials

Photoelectrochemical cells

Photoelectrodes

(method of producing ion conductive laminate for **electrolyte**  
application in **electrochem.** cells)

IT Alkali metal salts

Phosphonium compounds

Quaternary ammonium compounds, uses

RL: DEV (Device component use); USES (Uses)

(method of producing ion conductive laminate for **electrolyte**  
application in **electrochem.** cells)

IT Polyanilines

RL: DEV (Device component use); SPN (Synthetic preparation); PREP

- (Preparation); USES (Uses)  
 (method of producing ion conductive laminate for **electrolyte** application in **electrochem.** cells)
- IT Polyesters, uses  
 RL: DEV (Device component use); TEM (Technical or engineered material use); USES (Uses)  
 (method of producing ion conductive laminate for **electrolyte** application in **electrochem.** cells)
- IT Polyoxyalkylenes, uses  
 RL: DEV (Device component use); TEM (Technical or engineered material use); USES (Uses)  
 (method of producing ion conductive laminate for **electrolyte** application in **electrochem.** cells)
- IT Plastics, uses  
 RL: DEV (Device component use); USES (Uses)  
 (thermoplastics; method of producing ion conductive laminate for **electrolyte** application in **electrochem.** cells)
- IT Plastics, uses  
 RL: DEV (Device component use); USES (Uses)  
 (thermosetting; method of producing ion conductive laminate for **electrolyte** application in **electrochem.** cells)
- IT 7440-44-0, Activated carbon, uses  
 RL: DEV (Device component use); USES (Uses)  
 (activated; method of producing ion conductive laminate for **electrolyte** application in **electrochem.** cells)
- IT 7429-90-5, Aluminum, uses 7782-42-5, Graphite, uses 9003-07-0, Polypropylene  
 RL: DEV (Device component use); USES (Uses)  
 (method of producing ion conductive laminate for **electrolyte** application in **electrochem.** cells)
- IT 1314-35-8P, Tungsten trioxide, uses 12190-79-3P, cobalt lithium oxide colio2 21324-40-3P, **Lithium** hexafluorophosphate 25233-30-1P, Polyaniline 25721-76-0DP, Polyethylene glycol dimethacrylate, **lithium** complexes 25749-57-9DP, Acrylonitrile-methacrylic acid copolymer, **lithium** complexes 106769-84-0P, Cadmium selenide telluride 118889-33-1DP, alkali metal complexes 355005-92-4DP, **lithium** complexes  
 RL: DEV (Device component use); SPN (Synthetic preparation); PREP (Preparation); USES (Uses)  
 (method of producing ion conductive laminate for **electrolyte** application in **electrochem.** cells)
- IT 429-06-1, Tetraethylammoniumtetrafluoroborate 1344-28-1, Alumina, uses 2926-30-9, Sodium triflate 7791-03-9, **Lithium** perchlorate 12597-68-1, stainless steel, uses 14283-07-9, **Lithium** tetrafluoroborate 25038-59-9, Polyethylene terephthalate, uses 25322-68-3, Polyethylene glycol  
 RL: DEV (Device component use); TEM (Technical or engineered material use); USES (Uses)  
 (method of producing ion conductive laminate for **electrolyte** application in **electrochem.** cells)
- IT 7439-93-2DP, **Lithium**, polymer complexes, uses 7440-23-5DP, Sodium, polymer complexes, uses 196618-28-7DP,

alkali metal complexes 355010-46-7DP, alkali metal complexes  
 RL: SPN (Synthetic preparation); TEM (Technical or engineered material  
 use); PREP (Preparation); USES (Uses)  
 (method of producing ion conductive laminate for **electrolyte**  
 application in **electrochem.** cells)

L23 ANSWER 27 OF 35 CAPLUS COPYRIGHT 2004 ACS on STN  
 ACCESSION NUMBER: 2001:451291 CAPLUS  
 DOCUMENT NUMBER: 135:63758  
 TITLE: **Polymer electrolyte** elements,  
 manufacture of the elements and rolls of the elements,  
 the **polymer electrolyte** element  
 rolls, and manufacture of **batteries**  
 INVENTOR(S): Amanokura, Hitoshi; Sonobe, Hiroyuki; Uehara, Hideaki;  
 Saito, Masayasu  
 PATENT ASSIGNEE(S): Hitachi Chemical Co., Ltd., Japan  
 SOURCE: Jpn. Kokai Tokkyo Koho, 15 pp.  
 CODEN: JKXXAF  
 DOCUMENT TYPE: Patent  
 LANGUAGE: Japanese  
 FAMILY ACC. NUM. COUNT: 1  
 PATENT INFORMATION:



PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
JP 2001167638	A2	20010622	JP 1999-348915	19991208
PRIORITY APPLN. INFO.:			JP 1999-348915	19991208

AB The **electrolyte** elements have a dried reaction layer of a  
 reactive resin on a support, and are prepared by applying the resin on the  
 support and drying when necessary. Preferably, the reactive resin  
 contains a resin having weight average mol. weight 1000-3,000,000, a ethylenic  
 unsatd. photopolymerizable component, and a photopolymn. initiator. The  
**polymer electrolyte** element rolls are prepared by rolling  
 the elements. The **batteries** are prepared by laminating the  
**polymer electrolyte** element, with **battery**  
 electrodes with the reaction layer in compact with the cathode or anode.

IT 1344-28-1, Alumina, uses  
 RL: DEV (Device component use); USES (Uses)  
 (compns. and manufacture of **polymer electrolyte**  
 components for secondary **lithium batteries**)

RN 1344-28-1 CAPLUS

CN Aluminum oxide (Al2O3) (8CI, 9CI) (CA INDEX NAME)

\*\*\* STRUCTURE DIAGRAM IS NOT AVAILABLE \*\*\*

IT 345663-84-5P 345663-87-8P

RL: DEV (Device component use); IMF (Industrial manufacture); PREP  
 (Preparation); USES (Uses)  
 (compns. and manufacture of **polymer electrolyte**  
 components for secondary **lithium batteries**)

RN 345663-84-5 CAPLUS

CN 2-Propenoic acid, 2-methyl-, (1-methylethylidene)bis(4,1-phenyleneoxy-2,1-  
 ethanediyl) ester, polymer with ethyl 2-propenoate,  $\alpha$ -hydro- $\omega$ -

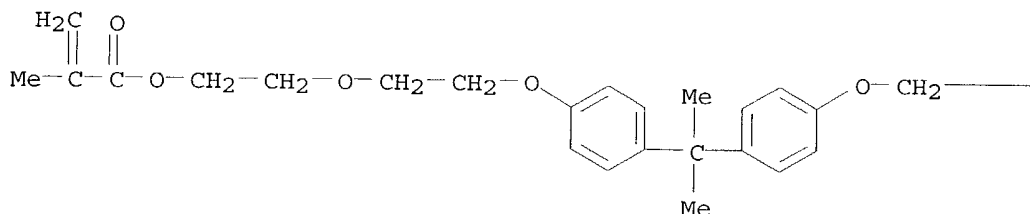
[(1-oxo-2-propenyl)oxy]poly(oxy-1,2-ethanediyl) ether with  
2-ethyl-2-(hydroxymethyl)-1,3-propanediol (3:1), (1-  
methylethylidene)bis(4,1-phenyleneoxy-2,1-ethanediyl)  
bis(2-methyl-2-propenoate), methyl 2-methyl-2-propenoate and  
2-propenenitrile (9CI) (CA INDEX NAME)

CM 1

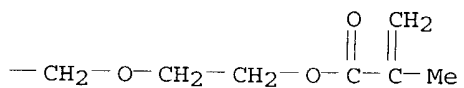
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CMF C31 H40 O8

PAGE 1-A



PAGE 1-B



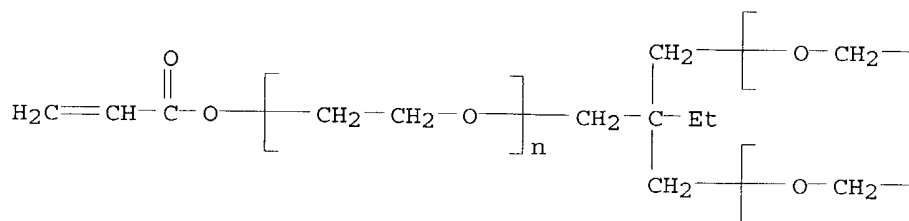
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CRN 28961-43-5

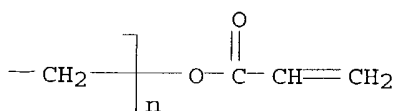
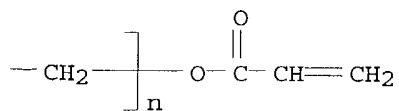
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CCI PMS

PAGE 1-A



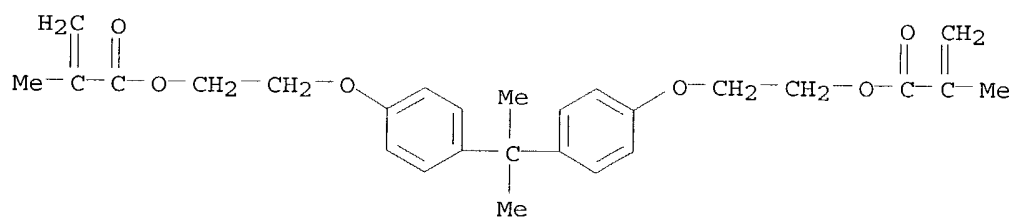
PAGE 1-B



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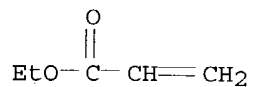
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CM 4

CRN 140-88-5

CMF C5 H8 O2



CM 5

CRN 107-13-1

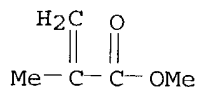
CMF C3 H3 N



CM 6



CRN 80-62-6  
CMF C5 H8 O2

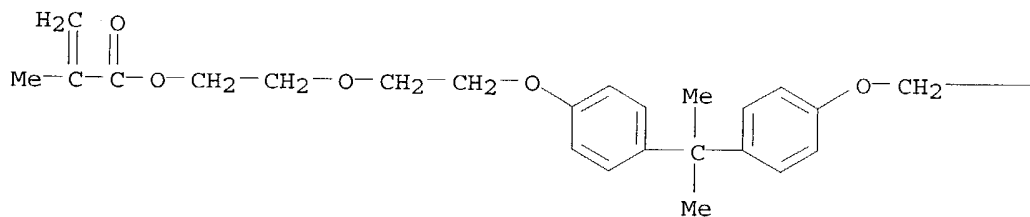


RN 345663-87-8 CAPLUS  
CN 2-Propenoic acid, 2-methyl-, (1-methylethylidene)bis(4,1-phenyleneoxy-2,1-ethanediyl) ester, polymer with ethyl 2-propenoate,  $\alpha$ -hydro- $\omega$ -[(1-oxo-2-propenyl)oxy]poly(oxy-1,2-ethanediyl) ether with 2-ethyl-2-(hydroxymethyl)-1,3-propanediol (3:1), methyl 2-methyl-2-propenoate and 2-propenenitrile (9CI) (CA INDEX NAME)

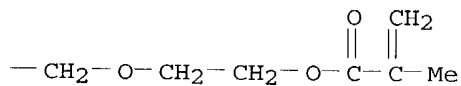
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CRN 56744-60-6  
CMF C31 H40 O8

PAGE 1-A



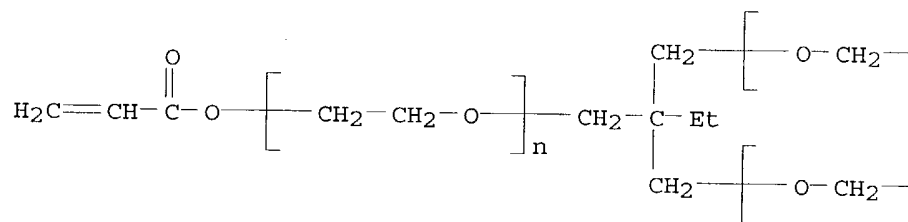
PAGE 1-B



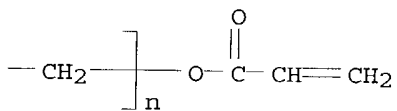
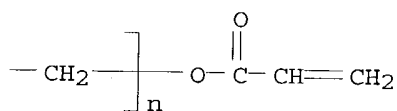
CM 2

CRN 28961-43-5  
CMF (C2 H4 O)<sub>n</sub> (C2 H4 O)<sub>n</sub> (C2 H4 O)<sub>n</sub> C15 H20 O6  
CCI PMS

PAGE 1-A



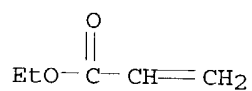
PAGE 1-B



CM 3

CRN 140-88-5

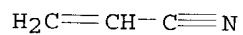
CMF C5 H8 O2



CM 4

CRN 107-13-1

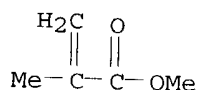
CMF C3 H3 N



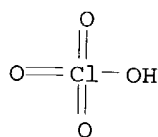
CM 5

CRN 80-62-6

CMF C5 H8 O2



IT 7791-03-9, Lithium perchlorate  
 RL: DEV (Device component use); USES (Uses)  
 (supports for **polymer electrolyte** components for  
 secondary **lithium batteries**)  
 RN 7791-03-9 CAPLUS  
 CN Perchloric acid, lithium salt (8CI, 9CI) (CA INDEX NAME)



● Li

IC ICM H01B005-14  
 ICS C08J007-04; H01M010-40; C09D201-00; H01B001-06  
 CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
 ST **battery polymer electrolyte** element manuf  
 IT **Battery electrolytes**  
 (compns. and manufacture of **polymer electrolyte**  
 components for secondary **lithium batteries**)  
 IT Polyesters, uses  
 RL: DEV (Device component use); USES (Uses)  
 (supports for **polymer electrolyte** components for  
 secondary **lithium batteries**)  
 IT 84-66-2, Dep 84-74-2, Dbp 1344-28-1, Alumina, uses  
 7631-86-9, aerosil 50, uses  
 RL: DEV (Device component use); USES (Uses)  
 (compns. and manufacture of **polymer electrolyte**  
 components for secondary **lithium batteries**)  
 IT 345663-84-5P 345663-85-6P 345663-86-7P 345663-87-8P  
 345663-88-9P  
 RL: DEV (Device component use); IMF (Industrial manufacture); PREP  
 (Preparation); USES (Uses)  
 (compns. and manufacture of **polymer electrolyte**  
 components for secondary **lithium batteries**)  
 IT 96-49-1, Ethylene carbonate 108-32-7, Propylene carbonate  
 7791-03-9, Lithium perchlorate 14283-07-9,  
 Lithium fluoroborate 21324-40-3, Lithium  
 hexafluorophosphate 25038-59-9, Poly(ethylene terephthalate), uses  
 RL: DEV (Device component use); USES (Uses)  
 (supports for **polymer electrolyte** components for

## secondary lithium batteries)

L23 ANSWER 28 OF 35 CAPLUS COPYRIGHT 2004 ACS on STN  
 ACCESSION NUMBER: 2001:319645 CAPLUS  
 DOCUMENT NUMBER: 134:313659  
 TITLE: **Polymer electrolyte membrane for use in lithium batteries**  
 INVENTOR(S): Heider, Udo; Oesten, Rudiger; Scrosati, Bruno; Croce, Fausto  
 PATENT ASSIGNEE(S): Merck Patent G.m.b.H., Germany  
 SOURCE: Eur. Pat. Appl., 6 pp.  
 CODEN: EPXXDW  
 DOCUMENT TYPE: Patent  
 LANGUAGE: English  
 FAMILY ACC. NUM. COUNT: 1  
 PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
EP 1096591	A1	20010502	EP 2000-122498	20001014
R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO				
TW 477083	B	<u>20020221</u>	TW 2000-89122360	20001024
JP 2001155770	A2	<u>20010608</u>	JP 2000-326338	20001026
CN 1303135	A	<u>20010711</u>	CN 2000-131956	20001026
PRIORITY APPLN. INFO.:			EP 1999-121289	A 19991026
			DE 1999-19951872	A 19991028

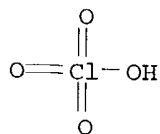
AB The invention relates to gel-like membranes comprising ceramic materials and intended for **electrochem.** cells. The **polymer** is selected from the group consisting of polyacrylonitrile, PMMA, polyvinyl chloride, polyvinyl sulfone, polyethylene glycol diacrylate, polyvinyl pyrrolidone, and/or polyvinylidene fluoride, and the ceramic is selected from Al oxide, Si oxide, Ti oxide, and/or Zr oxide.

IT **1344-28-1**, Aluminum oxide, uses **7791-03-9**, **Lithium perchlorate 13463-67-7**, Titania, uses **25014-41-9**, Polyacrylonitrile  
 RL: DEV (Device component use); USES (Uses)  
 (**polymer electrolyte membrane for use in lithium batteries**)

RN 1344-28-1 CAPLUS  
 CN Aluminum oxide (Al2O3) (8CI, 9CI) (CA INDEX NAME)

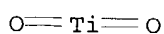
\*\*\* STRUCTURE DIAGRAM IS NOT AVAILABLE \*\*\*

RN 7791-03-9 CAPLUS  
 CN Perchloric acid, lithium salt (8CI, 9CI) (CA INDEX NAME)



● Li

RN 13463-67-7 CAPLUS  
CN Titanium oxide (TiO<sub>2</sub>) (8CI, 9CI) (CA INDEX NAME)



RN 25014-41-9 CAPLUS  
CN 2-Propenenitrile, homopolymer (9CI) (CA INDEX NAME)

CM 1

CRN 107-13-1  
CMF C3 H3 N



IC ICM H01M010-40  
ICS B01D071-68; B01D071-38; B01D071-34; B01D071-42; H01M004-62;  
H01M002-16; H01G009-02; C08J005-22  
CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
Section cross-reference(s): 38  
ST **lithium battery polymer based gel membrane**  
IT **Secondary batteries**  
(**lithium; polymer electrolyte membrane**  
for use in **lithium batteries**)  
IT **Battery electrolytes**  
Ceramics  
(**polymer electrolyte membrane for use in**  
**lithium batteries**)  
IT Fluoropolymers, uses  
**Polymers, uses**  
RL: DEV (Device component use); USES (Uses)  
(**polymer electrolyte membrane for use in**  
**lithium batteries**)  
IT Vinyl compounds, uses  
RL: DEV (Device component use); USES (Uses)  
(**sulfones, polymers; polymer electrolyte**  
membrane for use in **lithium batteries**)

IT Sulfones

RL: DEV (Device component use); USES (Uses)  
 (vinyl, **polymers; polymer electrolyte**  
 membrane for use in **lithium batteries**)

IT 96-49-1, Ethylene carbonate 616-38-6, Dimethyl carbonate 1314-23-4,  
 Zirconia, uses **1344-28-1**, Aluminum oxide, uses 7631-86-9,  
 Silica, uses **7791-03-9**, **Lithium** perchlorate  
 9002-86-2, Polyvinyl chloride 9003-39-8, Polyvinyl pyrrolidone  
 9011-14-7, Pmma **13463-67-7**, Titania, uses 21324-40-3,  
**Lithium** hexafluorophosphate 24937-79-9, Polyvinylidene fluoride  
**25014-41-9**, Polyacrylonitrile 26570-48-9, Polyethylene glycol  
 diacrylate 132404-42-3

RL: DEV (Device component use); USES (Uses)  
 (**polymer electrolyte** membrane for use in  
**lithium batteries**)

REFERENCE COUNT: 8 THERE ARE 8 CITED REFERENCES AVAILABLE FOR THIS  
 RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L23 ANSWER 29 OF 35 CAPLUS COPYRIGHT 2004 ACS on STN

ACCESSION NUMBER: 2001:168300 CAPLUS

DOCUMENT NUMBER: 134:210511

TITLE: All-solid-state **electrochemical** device and  
 method of manufacturing

INVENTOR(S): Munshi, M. Zafar A.

PATENT ASSIGNEE(S): Lithium Power Technologies, Inc., USA

SOURCE: PCT Int. Appl., 51 pp.

CODEN: PIXXD2

DOCUMENT TYPE: Patent

LANGUAGE: English

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 2001017052	A2	20010308	WO 2000-US22917	20000821
WO 2001017052	A3	20020221		

W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN,  
 CR, CU, CZ, DE, DK, DM, DZ, EE, ES, FI, GB, GD, GE, GH, GM, HR,  
 HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT,  
 LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PL, PT, RO, RU,  
 SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, UZ, VN, YU,  
 ZA, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM

RW: GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW, AT, BE, CH, CY,  
 DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, BF, BJ,  
 CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG

US 6664006	B1	20031216	US 1999-388733	19990902
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TW 521450	B	20030221	TW 2000-89116078	20000810
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JP 2003508887	T2	20030304	JP 2001-520497	20000821
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PRIORITY APPLN. INFO.:	US 1999-388733	A	19990902
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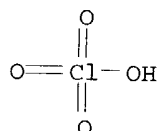
WO 2000-US22917	W	20000821
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AB All-solid-state **electrochem.** cells and **batteries**  
 employing very thin film, highly conductive **polymeric**

**electrolyte** and very thin electrode structures are disclosed, along with economical and high-speed methods of manufacturing. A preferred embodiment is a rechargeable **lithium polymer electrolyte battery**. New **polymeric electrolytes** employed in the devices are strong yet flexible, dry and non-tacky. The new, thinner electrode structures have strength and flexibility characteristics very much like thin film capacitor dielectric material that can be tightly wound in the making of a capacitor. A wide range of **polymers**, or **polymer** blends, characterized by high ionic conductivity at room temperature, and below, are used as the **polymer** base material for making the solid **polymer electrolytes**. The preferred **polymeric electrolyte** is a cationic conductor. In addition to the **polymer** base material, the **polymer electrolyte compns.** exhibit a conductivity greater than  $1 \times 10^{-4}$  S/cm at 25° or below and contain an elec. conductive **polymer**, a metal salt, a finely divided ionic conductor, and a finely divided inorg. filler material. Certain rechargeable **batteries** of the invention provide high specific energy (250 to 350 Wh/kg) (gravimetric) and energy d. (450 to 550 Wh/L) (volumetric), high cycle life (1000 cycles), low self-discharge and improved safety.

IT 1344-28-1, Alumina, uses 7791-03-9, **Lithium perchlorate** 25014-41-9, Polyacrylonitrile  
 RL: DEV (Device component use); USES (Uses)  
 (all-solid-state **electrochem.** device and method of manufacturing)  
 RN 1344-28-1 CAPLUS  
 CN Aluminum oxide (Al<sub>2</sub>O<sub>3</sub>) (8CI, 9CI) (CA INDEX NAME)

\*\*\* STRUCTURE DIAGRAM IS NOT AVAILABLE \*\*\*  
 RN 7791-03-9 CAPLUS  
 CN Perchloric acid, lithium salt (8CI, 9CI) (CA INDEX NAME)

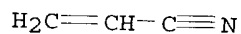


● Li

RN 25014-41-9 CAPLUS  
 CN 2-Propenenitrile, homopolymer (9CI) (CA INDEX NAME)

CM 1

CRN 107-13-1  
 CMF C3 H3 N



- IC ICM H01M010-40
- ICS H01G009-02; H01B001-12
- CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
Section cross-reference(s): 38
- ST **lithium polymer electrolyte battery**  
; safety **lithium polymer electrolyte battery**
- IT Conducting **polymers**  
(Li-doped; all-solid-state **electrochem.** device and method of manufacturing)
- IT **Battery electrolytes**  
Ionic conductors  
**Polymer electrolytes**  
**Polymer networks**  
(all-solid-state **electrochem.** device and method of manufacturing)
- IT Acrylic **polymers**, uses  
Fluoropolymers, uses  
Oxides (inorganic), uses  
Polyacetylenes, uses  
Polyanilines  
Polycarbonates, uses  
Polyesters, uses  
**Polymers**, uses  
Polyoxyalkylenes, uses  
Polysiloxanes, uses  
Polythiophenylenes  
Selenides  
Sulfides, uses  
RL: DEV (Device component use); USES (Uses)  
(all-solid-state **electrochem.** device and method of manufacturing)
- IT Silicates, uses  
RL: MOA (Modifier or additive use); USES (Uses)  
(all-solid-state **electrochem.** device and method of manufacturing)
- IT **Polymers**, uses  
RL: DEV (Device component use); USES (Uses)  
(co-; all-solid-state **electrochem.** device and method of manufacturing)
- IT Secondary **batteries**  
(**lithium**; all-solid-state **electrochem.** device and method of manufacturing)
- IT 1313-13-9, Manganese oxide mno2, uses 1314-35-8, Tungsten trioxide, uses  
1314-62-1, Vanadia, uses **1344-28-1**, Alumina, uses 7439-93-2,  
**Lithium**, uses 7439-93-2D, **Lithium**, salt, uses  
7439-95-4, Magnesium, uses 7440-09-7, Potassium, uses 7440-23-5,  
Sodium, uses 7440-66-6, Zinc, uses 7440-70-2, Calcium, uses  
**7791-03-9**, **Lithium perchlorate** 9002-83-9,  
Poly(chlorotrifluoroethylene) 9002-85-1, Ethene, 1,1-dichloro-,  
homopolymer 9003-07-0, Polypropylene 9010-79-1D, Ethylene-propylene  
copolymer, fluorinated 9011-14-7, Pmma 9020-32-0 9020-73-9,



Polyethylene naphthalate 12017-00-4, Cobalt oxide coo2 12034-78-5,  
Niobium selenide nbse3 12036-21-4, Vanadium oxide vo2 12039-13-3,  
Titanium disulfide 12057-17-9, **Lithium** manganese oxide  
(limn2o4) 12137-52-9, Vanadium oxide v3o8 12138-17-9, Vanadium sulfide  
v2s5 12158-49-5, Chromium oxide cr3o8 12218-36-9, Chromium oxide cr2o5  
14024-11-4, **Lithium** tetrachloroaluminate 14283-07-9,  
**Lithium** tetrafluoroborate 21324-40-3, **Lithium**  
hexafluorophosphate 24937-79-9, PvdF 25014-41-9,  
Polyacrylonitrile 25067-58-7, Polyacetylene 25067-61-2,  
Polymethacrylonitrile 25101-45-5, Ethylene-chlorotrifluoroethylene  
copolymer 25233-30-1, Polyaniline 25322-68-3, Peo 29935-35-1,  
**Lithium** hexafluoroarsenate 30604-81-0, Polypyrrole 33454-82-9,  
**Lithium** triflate 39300-70-4, **Lithium** nickel oxide  
90076-65-6 131344-56-4, Cobalt **lithium** nickel oxide  
132404-42-3 162684-16-4, **Lithium** manganese nickel oxide  
214536-41-1, Cobalt **Lithium** manganese oxide 329028-78-6  
329028-80-0

RL: DEV (Device component use); USES (Uses)

(all-solid-state **electrochem.** device and method of manufacturing)

IT 25038-59-9, Polyethylene terephthalate, uses

RL: TEM (Technical or engineered material use); USES (Uses)

(all-solid-state **electrochem.** device and method of manufacturing)

IT 7631-86-9, Fumed silica, uses

RL: DEV (Device component use); USES (Uses)

(colloidal; all-solid-state **electrochem.** device and method of  
manufacturing)

IT 7429-90-5, Aluminum, uses 7440-02-0, Nickel, uses 7440-44-0, Carbon,  
uses 7440-50-8, Copper, uses 7440-57-5, Gold, uses 12597-68-1,  
Stainless steel, uses 12606-02-9, Inconel

RL: DEV (Device component use); USES (Uses)

(current collector; all-solid-state **electrochem.** device and  
method of manufacturing)

IT 37220-89-6, **Lithium**  $\beta$  alumina

RL: MOA (Modifier or additive use); USES (Uses)

( $\beta$ -type; all-solid-state **electrochem.** device and method  
of manufacturing)

L23 ANSWER 30 OF 35 CAPLUS COPYRIGHT 2004 ACS on STN

ACCESSION NUMBER: 2001:12793 CAPLUS

DOCUMENT NUMBER: 134:74037

TITLE: Improved **lithium** ion polymer  
**electrolytes** and methods of manufacturing an  
**electrochemical** cell

INVENTOR(S): Munshi, M. Zafar A.

PATENT ASSIGNEE(S): Lithium Power Technologies, Inc., USA

SOURCE: PCT Int. Appl., 43 pp.

CODEN: PIXXD2

DOCUMENT TYPE: Patent

LANGUAGE: English

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 2001001507	A1	20010104	WO 2000-US16294	20000626
W: AU, BR, CA, CN, ID, IL, IN, JP, KR, MX, SG, VN				
RW: AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE				
US 6413676	B1	20020702	US 1999-340944	19990628
JP 2003503822	T2	20030128	JP 2001-506631	20000626
US 2003091904	A1	20030515	US 2002-187483	20020702
PRIORITY APPLN. INFO.:			US 1999-340944 A	19990628
			WO 2000-US16294 W	20000626

AB A dimensionally stable, highly resilient, hybrid copolymer solid-solution **electrolyte**-retention film for use in a **lithium** ion **battery** in one preferred embodiment has a predominantly amorphous structure and mech. strength despite contact with liquid solvent **electrolyte**. The film is a thinned (stretched), cast film of a homogeneous blend of two or more **polymers**, one of which is selected for its pronounced solvent retention properties. A very high surface area inorg. filler dispersed in the blend during formation thereof serves to increase the porosity of the film and thereby enhance **electrolyte** retention. The film is soaked in a solution of liquid **polymer** with liquid organic solvent **electrolyte** and **lithium** salt, for absorption thereof. Use of a crosslinked liquid **polymer** enhances trapping of mols. of the **electrolyte** into pores of the film. The **electrolyte** film is sandwiched between flexible active anode and cathode layers to form the **lithium** ion **battery**. Novel methods are provided for forming the electrodes, the **polymer** substrate, and other elements of the **battery**.

IT 1344-28-1, Alumina, uses  
 RL: DEV (Device component use); MOA (Modifier or additive use); USES (Uses)  
 (filler; improved **lithium** ion **polymer** **electrolytes** and methods of manufacturing **electrochem.** cell)

RN 1344-28-1 CAPLUS

CN Aluminum oxide (Al2O3) (8CI, 9CI) (CA INDEX NAME)

\*\*\* STRUCTURE DIAGRAM IS NOT AVAILABLE \*\*\*

IT 25014-41-9, Polyacrylonitrile  
 RL: DEV (Device component use); USES (Uses)  
 (improved **lithium** ion **polymer** **electrolytes** and methods of manufacturing **electrochem.** cell)

RN 25014-41-9 CAPLUS

CN 2-Propenenitrile, homopolymer (9CI) (CA INDEX NAME)

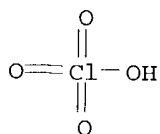
CM 1

CRN 107-13-1

CMF C3 H3 N



IT 7791-03-9, **Lithium perchlorate**  
RL: DEV (Device component use); TEM (Technical or engineered material use); USES (Uses)  
(improved **lithium ion polymer electrolytes**  
and methods of manufacturing **electrochem. cell**)  
RN 7791-03-9 CAPLUS  
CN Perchloric acid, lithium salt (8CI, 9CI) (CA INDEX NAME)



● Li

IC ICM H01M006-18  
CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
Section cross-reference(s): 38  
ST **battery lithium ion polymer electrolyte**  
IT **Conducting polymers**  
(Li-doped; improved **lithium ion polymer electrolytes** and methods of manufacturing **electrochem. cell**)  
IT Polyacetylenes, uses  
Polyanilines  
RL: DEV (Device component use); USES (Uses)  
(Li-doped; improved **lithium ion polymer electrolytes** and methods of manufacturing **electrochem. cell**)  
IT **Battery electrolytes**  
Electron beams  
**Polymer electrolytes**  
UV radiation  
(improved **lithium ion polymer electrolytes** and methods of manufacturing **electrochem. cell**)  
IT **Acrylic polymers**, uses  
Fluoropolymers, uses  
Polycarbonates, uses  
Polyesters, uses  
Polyoxyalkylenes, uses  
Polysiloxanes, uses  
Polythiophenylenes  
RL: DEV (Device component use); USES (Uses)  
(improved **lithium ion polymer electrolytes**

- and methods of manufacturing **electrochem. cell**)
- IT Secondary **batteries**  
 (lithium; improved lithium ion polymer  
**electrolytes** and methods of manufacturing **electrochem.**  
 cell)
- IT Polyoxyalkylenes, uses  
 RL: DEV (Device component use); USES (Uses)  
 (oxymethylene-linked; improved lithium ion polymer  
**electrolytes** and methods of manufacturing **electrochem.**  
 cell)
- IT Urethanes  
 RL: TEM (Technical or engineered material use); USES (Uses)  
 (trifunctional, crosslinking agent; improved lithium ion  
**polymer electrolytes** and methods of manufacturing  
**electrochem. cell**)
- IT 25067-58-7, Polyacetylene 25233-30-1, Polyaniline 30604-81-0,  
 Polypyrrole  
 RL: DEV (Device component use); USES (Uses)  
 (Li-doped; improved lithium ion polymer  
**electrolytes** and methods of manufacturing **electrochem.**  
 cell)
- IT 7631-86-9, Fumed silica, uses  
 RL: DEV (Device component use); MOA (Modifier or additive use); USES  
 (Uses)  
 (colloidal, filler; improved lithium ion polymer  
**electrolytes** and methods of manufacturing **electrochem.**  
 cell)
- IT 7429-90-5, Aluminum, uses 7440-02-0, Nickel, uses 7440-50-8, Copper,  
 uses 7440-66-6, Zinc, uses 12597-68-1, Stainless steel, uses  
 RL: DEV (Device component use); USES (Uses)  
 (current collector; improved lithium ion polymer  
**electrolytes** and methods of manufacturing **electrochem.**  
 cell)
- IT 1344-28-1, Alumina, uses  
 RL: DEV (Device component use); MOA (Modifier or additive use); USES  
 (Uses)  
 (filler; improved lithium ion polymer  
**electrolytes** and methods of manufacturing **electrochem.**  
 cell)
- IT 1332-29-2, Tin oxide 7440-44-0D, Carbon, intercalation compds., uses  
 9002-84-0, Ptfe 9003-07-0, Polypropylene 9003-11-6, Ethylene  
 oxide-propylene oxide copolymer 9011-14-7, Pmma 11126-15-1,  
**Lithium** vanadium oxide 12057-17-9, **Lithium** manganese  
 oxide LiMn2O4 12423-04-0, **Lithium** vanadium oxide LiV3O8  
 24937-79-9, PvdF 24968-11-4, Polyethylene naphthalate 25014-41-9  
 , Polyacrylonitrile 25038-59-9, Polyethylene terephthalate, uses  
 25067-61-2, Polymethacrylonitrile 25230-87-9 25322-68-3, Peo  
 25322-68-3D, Peo, oxymethylene-linked 30871-57-9, Propylene-vinylidene  
 fluoride copolymer 39300-70-4, **Lithium** nickel oxide  
 39457-42-6, **Lithium** manganese oxide 52627-24-4, Cobalt  
**lithium** oxide 61673-65-2, **Lithium** niobium selenide  
 74245-06-0, **Lithium** vanadium sulfide 98973-15-0 131344-56-4,

Cobalt **lithium** nickel oxide 136511-06-3, Meep 162684-16-4,  
**Lithium** manganese nickel oxide 214536-41-1, Cobalt  
**lithium** manganese oxide

RL: DEV (Device component use); USES (Uses)

(improved **lithium** ion **polymer electrolytes**  
and methods of manufacturing **electrochem.** cell)

IT 96-49-1, Ethylene carbonate 105-58-8, Diethyl carbonate 108-32-7,  
Propylene carbonate 616-38-6, Dimethyl carbonate 7791-03-9,  
**Lithium** perchlorate 14024-11-4, **Lithium**  
tetrachloroaluminate 14283-07-9, **Lithium** tetrafluoroborate  
21324-40-3, **Lithium** hexafluorophosphate 29935-35-1,  
**Lithium** hexafluoroarsenate 33454-82-9, **Lithium**  
triflate 90076-65-6, **Lithium** bis(trifluoromethanesulfonyl)imid  
e 132404-42-3

RL: DEV (Device component use); TEM (Technical or engineered material  
use); USES (Uses)

(improved **lithium** ion **polymer electrolytes**  
and methods of manufacturing **electrochem.** cell)

REFERENCE COUNT: 3 THERE ARE 3 CITED REFERENCES AVAILABLE FOR THIS  
RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L23 ANSWER 31 OF 35 CAPLUS COPYRIGHT 2004 ACS on STN

ACCESSION NUMBER: 2000:442060 CAPLUS

DOCUMENT NUMBER: 133:46207

TITLE: Microporous solid **electrolytes** for  
**lithium** secondary **batteries**

INVENTOR(S): Jang, Dong Hun; Kim, Sa Heum; Kim, Han Jun; Hong, Sung  
Min

PATENT ASSIGNEE(S): Finecell Co., Ltd., S. Korea

SOURCE: PCT Int. Appl., 46 pp.

CODEN: PIXXD2

DOCUMENT TYPE: Patent

LANGUAGE: English

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 2000038263	A1	20000629	WO 1999-KR798	19991221
W: CN, JP, US				
RW: AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE				
EP 1171927	A1	20020116	EP 1999-960009	19991221
R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, FI				
JP 2002543554	T2	20021217	JP 2000-590241	19991221
PRIORITY APPLN. INFO.:			KR 1998-57031	A 19981222
			WO 1999-KR798	W 19991221

AB The present invention relates to a solid **electrolyte** having a  
good conductivity to **lithium** ion by allowing the liquid components and  
**lithium** salts to be absorbed into the **electrolyte** film  
containing an absorbent added at the time of its preparation and having a  
porosity,

a process for preparing the same and a rechargeable **lithium** cell using the same as an **electrolyte**. As the absorbent, inorg. materials having not more than 40  $\mu\text{m}$  of particle size can be used. As the **polymer** binder, any binder whose solubility against the liquid **electrolyte** is small can be used. A wet process can introduce the porous structure of the **electrolyte** film. The solid **electrolyte** according to the present invention has the ionic conductivity of more than approx. 1 to 3 x 10<sup>-3</sup> S/cm at room temperature and low reactivity to **lithium** metal. The cell is fabricated from the solid **electrolyte** together with electrodes by lamination or pressing methods and, the liquid **electrolyte**, which is decomposed by moisture, is introduced to a cell just before packaging. Therefore, the solid **electrolyte** according to the present invention is not affected by the humidity and temperature conditions during the manufacturing of the

**electrolyte** film. In addition, the solid **electrolyte** according to the present invention has high thermal, mech. and **electrochem.** stability, and thus is suitable as an **electrolyte** for rechargeable **lithium** cells.

IT 25014-41-9, Polyacrylonitrile

RL: TEM (Technical or engineered material use); USES (Uses)  
(binder; microporous solid **electrolytes** for **lithium** secondary **batteries**)

RN 25014-41-9 CAPLUS

CN 2-Propenenitrile, homopolymer (9CI) (CA INDEX NAME)

CM 1

CRN 107-13-1

CMF C3 H3 N

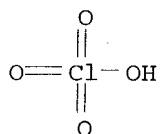


IT 7791-03-9, **Lithium** perchlorate

RL: DEV (Device component use); USES (Uses)  
(microporous solid **electrolytes** for **lithium** secondary **batteries**)

RN 7791-03-9 CAPLUS

CN Perchloric acid, lithium salt (8CI, 9CI) (CA INDEX NAME)



● Li

IT 1344-28-1, Alumina, uses  
RL: DEV (Device component use); TEM (Technical or engineered material use); USES (Uses)  
(porous, absorbent; microporous solid **electrolytes** for **lithium secondary batteries**)

RN 1344-28-1 CAPLUS

CN Aluminum oxide (Al2O3) (8CI, 9CI) (CA INDEX NAME)

\*\*\* STRUCTURE DIAGRAM IS NOT AVAILABLE \*\*\*

IC ICM H01M010-36

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
Section cross-reference(s): 38

ST **lithium battery** microporous solid **electrolyte**

IT Cellulose pulp  
Cork  
(absorbent; microporous solid **electrolytes** for **lithium secondary batteries**)

IT Polyurethanes, uses  
Zeolites (synthetic), uses  
RL: DEV (Device component use); TEM (Technical or engineered material use); USES (Uses)  
(absorbent; microporous solid **electrolytes** for **lithium secondary batteries**)

IT Synthetic rubber, uses  
RL: TEM (Technical or engineered material use); USES (Uses)  
(acrylic-acrylonitrile-butadiene, binder; microporous solid **electrolytes** for **lithium secondary batteries**)  
)

IT EPDM rubber  
Fluoropolymers, uses  
Polycarbonates, uses  
Polyethers, uses  
Polyimides, uses  
**Polymers**, uses  
Polyoxyalkylenes, uses  
Polysulfones, uses  
RL: TEM (Technical or engineered material use); USES (Uses)  
(binder; microporous solid **electrolytes** for **lithium secondary batteries**)

IT Wood  
(flour, absorbent; microporous solid **electrolytes** for **lithium secondary batteries**)

IT Polyvinyl acetals  
RL: TEM (Technical or engineered material use); USES (Uses)  
(formals, binder; microporous solid **electrolytes** for **lithium secondary batteries**)

IT Secondary **batteries**  
(**lithium**; microporous solid **electrolytes** for **lithium secondary batteries**)

IT Molecular sieves  
(mesoporous, absorbent; microporous solid **electrolytes** for

- lithium secondary batteries)**
- IT Absorbents
  - Battery electrolytes**
  - (microporous solid electrolytes for lithium secondary batteries)
- IT Clays, uses
  - Mica-group minerals, uses
  - Minerals, uses
  - RL: DEV (Device component use); TEM (Technical or engineered material use); USES (Uses)
  - (particles, absorbent; microporous solid electrolytes for lithium secondary batteries)
- IT Binders
  - (polymers; microporous solid electrolytes for lithium secondary batteries)
- IT 9002-88-4 9003-07-0, Polypropylene 9003-53-6, Polystyrene 9004-34-6, Cellulose, uses
  - RL: DEV (Device component use); TEM (Technical or engineered material use); USES (Uses)
  - (absorbent; microporous solid electrolytes for lithium secondary batteries)
- IT 9002-86-2, Pvc 9002-89-5, Polyvinyl alcohol 9003-21-8, 2-Propenoic acid, methyl ester, homopolymer 9003-27-4, Polyisobutylene 9011-14-7, Pmma 9011-17-0, Vinylidene fluoride-hexafluoropropylene copolymer 9012-09-3, Cellulose triacetate 9016-00-6, Polydimethylsiloxane 17831-71-9, Tetraethyleneglycol diacrylate 24937-79-9, PvdF 25014-41-9, Polyacrylonitrile 25322-68-3 26967-02-2, Poly(butylidene) 114481-92-4, Maleic anhydride-Vinylidene fluoride copolymer
  - RL: TEM (Technical or engineered material use); USES (Uses)
  - (binder; microporous solid electrolytes for lithium secondary batteries)
- IT 67-68-5, DmsO, uses 68-12-2, uses 96-47-9, 2-Methyltetrahydrofuran 96-48-0,  $\gamma$ -Butyrolactone 96-49-1, Ethylene carbonate 105-58-8, Diethyl carbonate 108-32-7, Propylene carbonate 109-99-9, uses 111-96-6, Diglyme 112-49-2, Triglyme 126-33-0 143-24-8, Tetraglyme 505-22-6, 1,3-Dioxane 556-65-0, **Lithium** thiocyanate 616-38-6, Dimethyl carbonate 623-53-0, Ethyl methyl carbonate 7782-42-5, Graphite, uses 7791-03-9, **Lithium** perchlorate 12162-79-7, **Lithium** manganese oxide  $\text{LiMnO}_2$  12190-79-3, Cobalt **lithium** oxide  $\text{CoLiO}_2$  14283-07-9, **Lithium** tetrafluoroborate 21324-40-3, **Lithium** hexafluorophosphate 29935-35-1, **Lithium** hexafluoroarsenate 33454-82-9, **Lithium** triflate 90076-65-6 132404-42-3
  - RL: DEV (Device component use); USES (Uses)
  - (microporous solid electrolytes for lithium secondary batteries)
- IT 56-81-5, 1,2,3-Propanetriol, uses 60-29-7, Ether, uses 64-17-5, Ethanol, uses 67-64-1, Acetone, uses 67-66-3, uses 71-36-3, Butanol, uses 75-05-8, Acetonitrile, uses 75-09-2, Dichloromethane, uses 107-21-1, 1,2-Ethanediol, uses 108-94-1, Cyclohexanone, uses 123-91-1, Dioxane, uses 127-19-5, Dimethyl acetamide 141-78-6, Acetic acid ethyl



ester, uses 680-31-9, Hexamethylphosphoramide, uses 872-50-4, uses 7732-18-5, Water, uses 25917-35-5, Hexanol 30899-19-5, Pentanol  
 RL: TEM (Technical or engineered material use); USES (Uses)  
 (microporous solid **electrolytes** for **lithium** secondary **batteries**)

IT 1318-93-0, Montmorillonite, uses 12026-53-8, Paragonite  
 RL: DEV (Device component use); TEM (Technical or engineered material use); USES (Uses)  
 (particles, absorbent; microporous solid **electrolytes** for **lithium** secondary **batteries**)

IT 1344-28-1, Alumina, uses 7631-86-9, Silica, uses  
 RL: DEV (Device component use); TEM (Technical or engineered material use); USES (Uses)  
 (porous, absorbent; microporous solid **electrolytes** for **lithium** secondary **batteries**)

REFERENCE COUNT: 2 THERE ARE 2 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L23 ANSWER 32 OF 35 CAPLUS COPYRIGHT 2004 ACS on STN

ACCESSION NUMBER: 2000:442059 CAPLUS

DOCUMENT NUMBER: 133:46206

TITLE: Solid **electrolytes** using absorbent for rechargeable **lithium batteries**

INVENTOR(S): Jang, Dong Hun; Kim, Sa Heum; Kim, Han Jun; Oh, Seung Mo

PATENT ASSIGNEE(S): Finecell Co., Ltd., S. Korea

SOURCE: PCT Int. Appl., 37 pp.

CODEN: PIXXD2

DOCUMENT TYPE: Patent

LANGUAGE: English

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 2000038262	A1	20000629	WO 1999-KR797	19991221
W: CN, JP, US				
RW: AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE				
EP 1145354	A1	20011017	EP 1999-960008	19991221
R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, FI				
JP 2002543553	T2	20021217	JP 2000-590240	19991221
PRIORITY APPLN. INFO.:			KR 1998-57030	A 19981222
			WO 1999-KR797	W 19991221

AB The present invention relates to a solid **electrolyte** having conductivity to **lithium** ion by providing spaces for liquid component and **lithium** salts to be absorbed by way of introducing an absorbent to the inside of an **electrolyte** film, a process for preparing the same and a rechargeable **lithium** cell using the same. As the absorbent, **polymers** or inorg. materials having not more than 40  $\mu\text{m}$  of particle size can be used. As the **polymer** binder, any

binder whose solubility against the liquid **electrolyte** is small can be used. The solid **electrolyte** according to the present invention has the ionic conductivity of more than approx.  $10^{-4}$  S/cm at room temperature

The cell

is fabricated from the solid **electrolyte** together with electrodes by lamination or pressing methods. The liquid **electrolyte**, which is decomposed by moisture, is introduced to a cell just before packaging. Therefore, the solid **electrolyte** according to the present invention is not affected by the humidity and temperature conditions during the manufacturing of the **electrolyte** film. In addition, the solid **electrolyte** according to the present invention has high mech. strength and little reactivity to **lithium** metal, and thus is suitable as an **electrolyte** for rechargeable **lithium** cells.

IT 9003-18-3

RL: TEM (Technical or engineered material use); USES (Uses)  
(nitrile rubber, solid **electrolytes** using absorbent for rechargeable **lithium batteries**)

RN 9003-18-3 CAPLUS

CN 2-Propenenitrile, polymer with 1,3-butadiene (9CI) (CA INDEX NAME)

CM 1

CRN 107-13-1

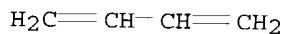
CMF C3 H3 N



CM 2

CRN 106-99-0

CMF C4 H6



IT 1344-28-1, Alumina, uses

RL: TEM (Technical or engineered material use); USES (Uses)  
(porous, particles; solid **electrolytes** using absorbent for rechargeable **lithium batteries**)

RN 1344-28-1 CAPLUS

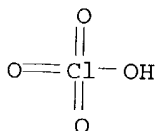
CN Aluminum oxide (Al<sub>2</sub>O<sub>3</sub>) (8CI, 9CI) (CA INDEX NAME)

\*\*\* STRUCTURE DIAGRAM IS NOT AVAILABLE \*\*\*

IT 7791-03-9, **Lithium** perchlorate

RL: DEV (Device component use); USES (Uses)  
(solid **electrolytes** using absorbent for rechargeable **lithium batteries**)

RN 7791-03-9 CAPLUS  
CN Perchloric acid, lithium salt (8CI, 9CI) (CA INDEX NAME)



● Li

IT 25014-41-9, Polyacrylonitrile  
RL: TEM (Technical or engineered material use); USES (Uses)  
(solid **electrolytes** using absorbent for rechargeable  
**lithium batteries**)  
RN 25014-41-9 CAPLUS  
CN 2-Propenenitrile, homopolymer (9CI) (CA INDEX NAME)

CM 1

CRN 107-13-1  
CMF C3 H3 N



IC ICM H01M010-36  
CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
Section cross-reference(s): 38  
ST **lithium battery electrolyte** absorbent  
IT Polysiloxanes, uses  
RL: TEM (Technical or engineered material use); USES (Uses)  
(Me; solid **electrolytes** using absorbent for rechargeable  
**lithium batteries**)  
IT Synthetic rubber, uses  
RL: TEM (Technical or engineered material use); USES (Uses)  
(acrylonitrile-butylidene; solid **electrolytes** using absorbent  
for rechargeable **lithium batteries**)  
IT Wood  
(flour; solid **electrolytes** using absorbent for rechargeable  
**lithium batteries**)  
IT Polyvinyl acetals  
RL: TEM (Technical or engineered material use); USES (Uses)  
(formals; solid **electrolytes** using absorbent for rechargeable  
**lithium batteries**)  
IT Secondary **batteries**  
(**lithium**; solid **electrolytes** using absorbent for  
rechargeable **lithium batteries**)

- IT Molecular sieves
  - (mesoporous; solid **electrolytes** using absorbent for rechargeable **lithium batteries**)
- IT Clays, uses
  - Mica-group minerals, uses
  - Minerals, uses
  - Zeolites (synthetic), uses
  - RL: TEM (Technical or engineered material use); USES (Uses)
    - (particles; solid **electrolytes** using absorbent for rechargeable **lithium batteries**)
- IT Cork
  - (powder; solid **electrolytes** using absorbent for rechargeable **lithium batteries**)
- IT Absorbents
  - Battery electrolytes**
  - Cellulose pulp
    - (solid **electrolytes** using absorbent for rechargeable **lithium batteries**)
- IT Carbon black, uses
  - RL: MOA (Modifier or additive use); USES (Uses)
    - (solid **electrolytes** using absorbent for rechargeable **lithium batteries**)
- IT EPDM rubber
  - RL: TEM (Technical or engineered material use); USES (Uses)
    - (solid **electrolytes** using absorbent for rechargeable **lithium batteries**)
- IT Fluoropolymers, uses
  - RL: TEM (Technical or engineered material use); USES (Uses)
    - (solid **electrolytes** using absorbent for rechargeable **lithium batteries**)
- IT Nitrile rubber, uses
  - RL: TEM (Technical or engineered material use); USES (Uses)
    - (solid **electrolytes** using absorbent for rechargeable **lithium batteries**)
- IT Polycarbonates, uses
  - RL: TEM (Technical or engineered material use); USES (Uses)
    - (solid **electrolytes** using absorbent for rechargeable **lithium batteries**)
- IT Polyethers, uses
  - RL: TEM (Technical or engineered material use); USES (Uses)
    - (solid **electrolytes** using absorbent for rechargeable **lithium batteries**)
- IT Polyimides, uses
  - RL: TEM (Technical or engineered material use); USES (Uses)
    - (solid **electrolytes** using absorbent for rechargeable **lithium batteries**)
- IT Polymers, uses
  - RL: TEM (Technical or engineered material use); USES (Uses)
    - (solid **electrolytes** using absorbent for rechargeable **lithium batteries**)
- IT Polyoxyalkylenes, uses
  - RL: TEM (Technical or engineered material use); USES (Uses)

(solid **electrolytes** using absorbent for rechargeable  
**lithium batteries**)

IT Polysulfones, uses  
RL: TEM (Technical or engineered material use); USES (Uses)  
(solid **electrolytes** using absorbent for rechargeable  
**lithium batteries**)

IT Polyurethanes, uses  
RL: TEM (Technical or engineered material use); USES (Uses)  
(solid **electrolytes** using absorbent for rechargeable  
**lithium batteries**)

IT 9003-18-3  
RL: TEM (Technical or engineered material use); USES (Uses)  
(nitrile rubber, solid **electrolytes** using absorbent for  
rechargeable **lithium batteries**)

IT 1318-93-0, Montmorillonite, uses 12026-53-8, Paragonite  
RL: TEM (Technical or engineered material use); USES (Uses)  
(particles; solid **electrolytes** using absorbent for  
rechargeable **lithium batteries**)

IT 1344-28-1, Alumina, uses 7631-86-9, Silica, uses  
RL: TEM (Technical or engineered material use); USES (Uses)  
(porous, particles; solid **electrolytes** using absorbent for  
rechargeable **lithium batteries**)

IT 67-68-5, DmsO, uses 68-12-2, uses 96-47-9, 2-Methyltetrahydrofuran  
96-48-0,  $\gamma$ -Butyrolactone 96-49-1, Ethylene carbonate 105-58-8,  
Diethyl carbonate 108-32-7, Propylene carbonate 109-99-9, uses  
111-96-6, Diglyme 112-49-2, Triglyme 126-33-0 143-24-8, Tetraglyme  
556-65-0, **Lithium** thiocyanate 616-38-6, Dimethyl carbonate  
623-53-0, Ethyl methyl carbonate 646-06-0, 1,3-Dioxolane 7782-42-5,  
Graphite, uses 7791-03-9, **Lithium** perchlorate  
12190-79-3, Cobalt **lithium** oxide colio2 14283-07-9,  
**Lithium** tetrafluoroborate 21324-40-3, **Lithium**  
hexafluorophosphate 29935-35-1, **Lithium** hexafluoroarsenate  
33454-82-9, **Lithium** triflate 90076-65-6 132404-42-3  
RL: DEV (Device component use); USES (Uses)  
(solid **electrolytes** using absorbent for rechargeable  
**lithium batteries**)

IT 9002-86-2, Polyvinyl chloride 9002-88-4 9002-89-5, Polyvinyl alcohol  
9003-07-0, Polypropylene 9003-27-4, Polyisobutylene 9003-53-6,  
Polystyrene 9004-34-6, Cellulose, uses 9011-14-7, Pmma 9011-17-0,  
Hexafluoropropylene-vinylidene fluoride copolymer 9012-09-3, Cellulose  
triacetate 17831-71-9, Tetraethylene glycol diacrylate 24937-79-9,  
Polyvinylidene fluoride 25014-41-9, Polyacrylonitrile  
25322-68-3 26967-02-2, Poly(butylidene) 114481-92-4, Maleic  
anhydride-vinylidene fluoride copolymer  
RL: TEM (Technical or engineered material use); USES (Uses)  
(solid **electrolytes** using absorbent for rechargeable  
**lithium batteries**)

REFERENCE COUNT: 2 THERE ARE 2 CITED REFERENCES AVAILABLE FOR THIS  
RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L23 ANSWER 33 OF 35 CAPLUS COPYRIGHT 2004 ACS on STN  
ACCESSION NUMBER: 1999:263256 CAPLUS

DOCUMENT NUMBER: 130:340568  
 TITLE: The characteristics of **polymer electrolyte for lithium polymer battery**  
 AUTHOR(S): Park, Soo-Gil; Park, Jong-Eun; Lee, Ju-Seong  
 CORPORATE SOURCE: Department of Industrial Chemical Engineering, Chungbuk National University, Chungbuk, S. Korea  
 SOURCE: Journal of the Korean Electrochemical Society (1999), 2(1), 1-4  
 CODEN: JKESFC; ISSN: 1229-1935  
 PUBLISHER: Korean Electrochemical Society  
 DOCUMENT TYPE: Journal  
 LANGUAGE: English

AB This paper reports primarily the recent development results of a solid **polymer electrolyte**, which is a key factor of the secondary **battery** system, that has been obtained during the process of the development of a **polymer type lithium battery**. The ionic conductivity of the solid **polymer electrolyte**, which is composed of polyacrylonitrile and LiClO<sub>4</sub> with Al<sub>2</sub>O<sub>3</sub> dissolved as the supporting **electrolyte**, has been confirmed to be 2.3+10<sup>-4</sup> S/cm at room temperature

IT 1344-28-1, Alumina, uses 7791-03-9, **Lithium perchlorate 25014-41-9**, Polyacrylonitrile  
 RL: DEV (Device component use); USES (Uses)  
 (characteristics of **polymer electrolyte for lithium polymer battery**)

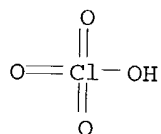
RN 1344-28-1 CAPLUS

CN Aluminum oxide (Al<sub>2</sub>O<sub>3</sub>) (8CI, 9CI) (CA INDEX NAME)

\*\*\* STRUCTURE DIAGRAM IS NOT AVAILABLE \*\*\*

RN 7791-03-9 CAPLUS

CN Perchloric acid, lithium salt (8CI, 9CI) (CA INDEX NAME)



● Li

RN 25014-41-9 CAPLUS

CN 2-Propenenitrile, homopolymer (9CI) (CA INDEX NAME)

CM 1

CRN 107-13-1

CMF C3 H3 N



CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
 Section cross-reference(s): 38  
 ST **polymer electrolyte lithium battery**  
 IT **Battery electrolytes**  
 Electric impedance  
 Ionic conductivity  
**Polymer electrolytes**  
 (characteristics of **polymer electrolyte** for  
**lithium polymer battery**)  
 IT Secondary batteries  
 (lithium; characteristics of **polymer**  
**electrolyte** for **lithium polymer**  
**battery**)  
 IT 96-49-1, Ethylene carbonate 108-32-7, Propylene carbonate  
 1344-28-1, Alumina, uses 7791-03-9, **Lithium**  
 perchlorate 25014-41-9, Polyacrylonitrile  
 RL: DEV (Device component use); USES (Uses)  
 (characteristics of **polymer electrolyte** for  
**lithium polymer battery**)  
 REFERENCE COUNT: 13 THERE ARE 13 CITED REFERENCES AVAILABLE FOR THIS  
 RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L23 ANSWER 34 OF 35 CAPLUS COPYRIGHT 2004 ACS on STN  
 ACCESSION NUMBER: 1998:603319 CAPLUS  
 DOCUMENT NUMBER: 129:278470  
 TITLE: Solid acrylic **polymer**-containing  
**electrolytes** for **lithium** secondary  
**batteries**  
 INVENTOR(S): Kim, Dong-Won; Kim, Yang-Rook; Oh, Bu-Keun; Baek,  
 Chang-Wu  
 PATENT ASSIGNEE(S): Samsung Display Devices Co., Ltd., S. Korea  
 SOURCE: Jpn. Kokai Tokkyo Koho, 14 pp.  
 CODEN: JKXXAF  
 DOCUMENT TYPE: Patent  
 LANGUAGE: Japanese  
 FAMILY ACC. NUM. COUNT: 1  
 PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
JP 10247417	A2	19980914	JP 1997-317540	19971118
JP 3233602	B2	20011126		
US 6001509	A	19991214	US 1997-971919	19971118
PRIORITY APPLN. INFO.:			KR 1996-54809	A 19961118
			KR 1997-15552	A 19970425
			KR 1997-22924	A 19970603

AB The **electrolytes** consist of (a) 50-90% acrylonitrile (I)-Me  
 metharylate (II) copolymer and 10-50% **electrolytic** solns. containing

Li salts and aprotic solvents, (b) 10-90% I-II-polyoxyethylene oligomer Et ether methacrylate copolymer and 10-90% of the above solns., or (b) 10-90%  $[\text{CH}_2\text{CR}_1(\text{CN})]_x[\text{CH}_2\text{CR}_1(\text{CO}_2\text{R}_2)]_y(\text{CH}_2\text{CR}_1\text{CX})_z$  [ $\text{R}_1 = \text{H}, \text{Me}$ ;  $\text{R}_2 = \text{alkyl}$ ;  $\text{X} = \text{Ph}, \text{Cl}, \text{F}, \text{OCMe}(\text{SIC})$ , heterocyclic group,  $\text{CO}_2(\text{CHR}_1\text{CH}_2)_n\text{Me}$ ;  $n = 1-12$ ] and 10-90% of the above solns. The Li secondary **batteries** using the **electrolytes** are also claimed. The **electrolytes** may contain ceramic fillers and the solns. may be filled in fine porous membranes. The **compns.** show good mech. properties and good ion conductivity and can be made into thin film **electrolytes** easily.

IT 25213-88-1P, Acrylonitrile-methyl methacrylate-styrene copolymer  
30396-85-1P, Acrylonitrile-methyl methacrylate copolymer  
197845-38-8P, Acrylonitrile-methyl methacrylate-polyethylene glycol ethyl ether methacrylate copolymer

RL: IMF (Industrial manufacture); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)

(acrylonitrile-Me methacrylate copolymer and lithium salt aprotic solvent solution as solid **electrolyte** for secondary **batteries**)

RN 25213-88-1 CAPLUS

CN 2-Propenoic acid, 2-methyl-, methyl ester, polymer with ethenylbenzene and 2-propenenitrile (9CI) (CA INDEX NAME)

CM 1

CRN 107-13-1

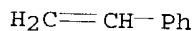
CMF C3 H3 N



CM 2

CRN 100-42-5

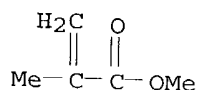
CMF C8 H8



CM 3

CRN 80-62-6

CMF C5 H8 O2





RN 30396-85-1 CAPLUS  
 CN 2-Propenoic acid, 2-methyl-, methyl ester, polymer with 2-propenenitrile  
 (9CI) (CA INDEX NAME)

CM 1

CRN 107-13-1

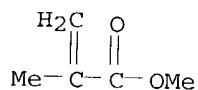
CMF C3 H3 N



CM 2

CRN 80-62-6

CMF C5 H8 O2



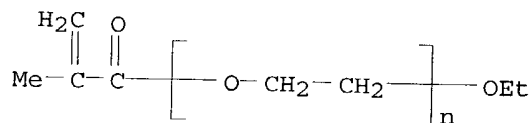
RN 197845-38-8 CAPLUS  
 CN 2-Propenoic acid, 2-methyl-, methyl ester, polymer with  
 $\alpha$ -(2-methyl-1-oxo-2-propenyl)- $\omega$ -ethoxypoly(oxy-1,2-ethanediyl)  
 and 2-propenenitrile (9CI) (CA INDEX NAME)

CM 1

CRN 35625-93-5

CMF (C2 H4 O)<sub>n</sub> C6 H10 O2

CCI PMS



CM 2

CRN 107-13-1

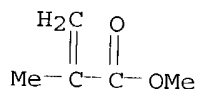
CMF C3 H3 N



CM 3

CRN 80-62-6

CMF C5 H8 O2

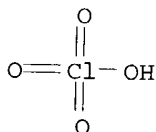


IT 7791-03-9, **Lithium perchlorate**

RL: TEM (Technical or engineered material use); USES (Uses)  
(acrylonitrile-Me methacrylate copolymer and **lithium salt**  
aprotic solvent solution as solid **electrolyte** for secondary  
**batteries**)

RN 7791-03-9 CAPLUS

CN Perchloric acid, lithium salt (8CI, 9CI) (CA INDEX NAME)



● Li

IT 1344-28-1, Alumina, uses

RL: MOA (Modifier or additive use); USES (Uses)  
(fillers; acrylonitrile-Me methacrylate copolymer and **lithium**  
salt aprotic solvent solution as solid **electrolyte** for secondary  
**batteries**)

RN 1344-28-1 CAPLUS

CN Aluminum oxide (Al<sub>2</sub>O<sub>3</sub>) (8CI, 9CI) (CA INDEX NAME)

\*\*\* STRUCTURE DIAGRAM IS NOT AVAILABLE \*\*\*

IC ICM H01B001-12

ICS C08K003-16; C08K003-22; C08K003-32; C08K003-34; C08K003-36;  
C08K003-38; C08K005-06; C08K005-109; C08L033-12; C08L033-20;  
H01M010-40

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
Section cross-reference(s): 38, 76

ST solid acrylic **polymer electrolyte** secondary  
**battery**; liq **electrolyte** soln acrylic **polymer**;

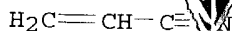
- lithium secondary battery acrylic polymer electrolyte; acrylonitrile methyl methacrylate copolymer solid electrolyte; polyoxyethylene methacrylate copolymer solid electrolyte; aprotic solvent polymer electrolyte soln; thin film electrolyte lithium secondary battery**
- IT **Solid electrolytes**  
(acrylonitrile-Me methacrylate copolymer and **lithium salt** aprotic solvent solution as solid **electrolyte** for secondary **batteries**)
- IT **Solvents**  
(aprotic; acrylonitrile-Me methacrylate copolymer and **lithium salt** aprotic solvent solution as solid **electrolyte** for secondary **batteries**)
- IT **Zeolites (synthetic), uses**  
RL: MOA (Modifier or additive use); USES (Uses)  
(fillers; acrylonitrile-Me methacrylate copolymer and **lithium salt** aprotic solvent solution as solid **electrolyte** for secondary **batteries**)
- IT **Ceramics**  
(fillers; acrylonitrile-Me methacrylate copolymer and **lithium salt** aprotic solvent solution as solid **electrolyte** for secondary **batteries**)
- IT **Secondary batteries**  
(**lithium**; acrylonitrile-Me methacrylate copolymer and **lithium salt** aprotic solvent solution as solid **electrolyte** for secondary **batteries**)
- IT **25213-88-1P, Acrylonitrile-methyl methacrylate-styrene copolymer**  
**30396-85-1P, Acrylonitrile-methyl methacrylate copolymer**  
**197845-38-8P, Acrylonitrile-methyl methacrylate-polyethylene glycol ethyl ether methacrylate copolymer**  
RL: IMF (Industrial manufacture); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)  
(acrylonitrile-Me methacrylate copolymer and **lithium salt** aprotic solvent solution as solid **electrolyte** for secondary **batteries**)
- IT **96-49-1, Ethylene carbonate 105-58-8, Diethyl carbonate 108-32-7, Propylene carbonate 110-71-4 616-38-6, Dimethyl carbonate 623-96-1, Dipropyl carbonate 73506-93-1, Diethoxyethane**  
RL: NUU (Other use, unclassified); USES (Uses)  
(acrylonitrile-Me methacrylate copolymer and **lithium salt** aprotic solvent solution as solid **electrolyte** for secondary **batteries**)
- IT **7791-03-9, Lithium perchlorate 14283-07-9, Lithium tetrafluoroborate 21324-40-3, Lithium hexafluorophosphate 29935-35-1, Lithium hexafluoroarsenate 33454-82-9, Lithium trifluoromethanesulfonate 155812-81-0**  
RL: TEM (Technical or engineered material use); USES (Uses)  
(acrylonitrile-Me methacrylate copolymer and **lithium salt** aprotic solvent solution as solid **electrolyte** for secondary **batteries**)
- IT **1344-28-1, Alumina, uses 7631-86-9, Silica, uses 37220-89-6,**

CN 2-Propenenitrile, homopolymer (9CI) (CA INDEX NAME)

CM 1

CRN 10

CMF C3



IT 1344-28-1, Alumina, uses and miscellaneous

RL: USES (Uses)

( $\gamma$ -, electrolytes containing, lithium

perchlorate-polyacrylonitrile, for secondary batteries)

RN 1344-28-1 CAPLUS

CN Aluminum oxide (Al<sub>2</sub>O<sub>3</sub>) (8CI, 9CI) (CA INDEX NAME)

\*\*\* STRUCTURE DIAGRAM IS NOT AVAILABLE \*\*\*

IC ICM H01M010-26

ICS H01M010-40; H01M006-18

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
Section cross-reference(s): 38

ST battery polyacrylonitrile alkali salt electrolyte

IT Batteries, secondary

(magnesium/manganese dioxide-molybdenum and lithium/titanium

disulfide-molybdenum, with lithium perchlorate-

polyacrylonitrile electrolytes)

IT 7791-03-9, Lithium perchlorate

RL: USES (Uses)

(electrolytes containing polyacrylonitrile and, for secondary  
batteries)

IT 7439-93-2D, Lithium, complexes with polyacrylonitrile

25014-41-9D, Polyacrylonitrile, lithium complexes

RL: USES (Uses)

(electrolytes, for secondary batteries)

IT 1344-28-1, Alumina, uses and miscellaneous

RL: USES (Uses)

( $\gamma$ -, electrolytes containing, lithium

perchlorate-polyacrylonitrile, for secondary batteries)

=>

**Lithium aluminate**

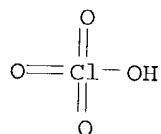
RL: MOA (Modifier or additive use); USES (Uses)  
(fillers; acrylonitrile-Me methacrylate copolymer and **lithium**  
salt aprotic solvent solution as solid **electrolyte** for secondary  
**batteries**)

L23 ANSWER 35 OF 35 CAPLUS COPYRIGHT 2004 ACS on STN  
ACCESSION NUMBER: 1990:462636 CAPLUS  
DOCUMENT NUMBER: 113:62636  
TITLE: Secondary **batteries** with solid  
**polymer electrolytes**  
INVENTOR(S): Jiang, Zhe; Yu, Mengqi; Zhu, Wencun; Tian, Qingyuan  
PATENT ASSIGNEE(S): Tianjin Normal Training School, Peop. Rep. China  
SOURCE: Faming Zhuanli Shenqing Gongkai Shuomingshu, 10 pp.  
CODEN: CNXXEV  
DOCUMENT TYPE: Patent  
LANGUAGE: Chinese  
FAMILY ACC. NUM. COUNT: 1  
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
CN 1030671	A	19890125	CN 1987-104786	19870711
			CN 1987-104786	19870711

PRIORITY APPLN. INFO.:  
AB A thin polyacrylonitrile-alkali metal salt complex film is used as  
**electrolyte** for **batteries**. Preferably, the mixing mol  
ratio of polyacrylonitrile:salt is (2-6):1 and the salt is selected from  
NaI, NaSCN, LiI, LiClO<sub>4</sub>, and CF<sub>3</sub>SO<sub>3</sub>Li. The **batteries** have a  
light metal (Li or its alloy, Al, Mg, and Zn) anode and a cathode of a  
metal ion-insertable material such as TiS<sub>2</sub>, MnO<sub>2</sub>, V<sub>6</sub>O<sub>13</sub>, Mo, and/or C.  
IT 7791-03-9, **Lithium perchlorate**  
RL: USES (Uses)  
(**electrolytes** containing polyacrylonitrile and, for secondary  
**batteries**)  
RN 7791-03-9 CAPLUS  
CN Perchloric acid, lithium salt (8CI, 9CI) (CA INDEX NAME)

*No. 11*



● Li

IT 25014-41-9D, Polyacrylonitrile, **lithium** complexes  
RL: USES (Uses)  
(**electrolytes**, for secondary **batteries**)  
RN 25014-41-9 CAPLUS

IT 1344-28-1, Alumina, uses 7791-03-9, Lithium  
perchlorate 24980-62-9, Acrylonitrile vinyl acetate copolymer  
25014-41-9, Polyacrylonitrile 25053-12-7, Acrylonitrile  
ethylacrylate copolymer  
RL: DEV (Device component use); USES (Uses)  
(gel electrolytic precursor and manufacturing of non-aqueous secondary  
battery)

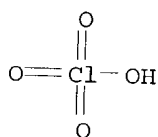
RN 1344-28-1 CAPLUS

CN Aluminum oxide (Al<sub>2</sub>O<sub>3</sub>) (8CI, 9CI) (CA INDEX NAME)

\*\*\* STRUCTURE DIAGRAM IS NOT AVAILABLE \*\*\*

RN 7791-03-9 CAPLUS

CN Perchloric acid, lithium salt (8CI, 9CI) (CA INDEX NAME)



● Li

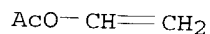
RN 24980-62-9 CAPLUS

CN Acetic acid ethenyl ester, polymer with 2-propenenitrile (9CI) (CA INDEX NAME)

CM 1

CRN 108-05-4

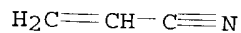
CMF C4 H6 O2



CM 2

CRN 107-13-1

CMF C3 H3 N



RN 25014-41-9 CAPLUS

CN 2-Propenenitrile, homopolymer (9CI) (CA INDEX NAME)

CM 1

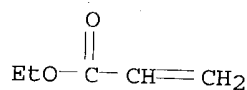
CRN 107-13-1  
CMF C3 H3 N



RN 25053-12-7 CAPLUS  
CN 2-Propenoic acid, ethyl ester, polymer with 2-propenenitrile (9CI) (CA  
INDEX NAME)

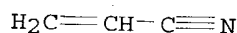
CM 1

CRN 140-88-5  
CMF C5 H8 O2



CM 2

CRN 107-13-1  
CMF C3 H3 N



IC ICM H01M010-40  
ICS C08J009-28; C08L101-00  
CC 52-1 (Electrochemical, Radiational, and Thermal Energy Technology)  
Section cross-reference(s): 72  
ST gel **electrolytic** precursor nonaq secondary **battery**  
IT Secondary **batteries**  
(gel **electrolytic** precursor and manufacturing of non-aqueous secondary  
**battery**)  
IT Carbon black, uses  
Carbon fibers, uses  
Fluoropolymers, uses  
Phenolic resins, uses  
**Polymers**, uses  
Polyoxyalkylenes, uses  
RL: DEV (Device component use); USES (Uses)  
(gel **electrolytic** precursor and manufacturing of non-aqueous secondary  
**battery**)  
IT 68-12-2, Dmf, uses 872-50-4, N-Methyl-2-pyrrolidone, uses 1313-13-9,  
Manganese dioxide, uses 1314-62-1, Vanadium oxide, uses 1317-33-5,